PRICE SECOND COPY, 25 CENTS

The Automobile Magazine

ILLUSTRATED

67166

Library of Congress
TWO COPIES RECEIVED
OCT 27 1900
Copyright entry

2nd Copy Delivered
PERIODICAL DIVISION
OCT 27 1900

VOL. II OCTOBER 1900 No. 7.

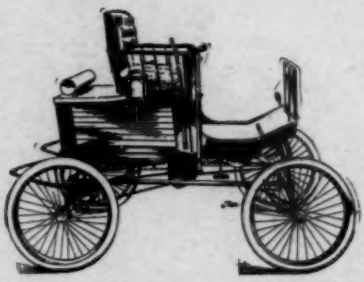
The Automobile Publishing Company
New York City U. S. A.

"Locomobile"

The "*Locomobile*" has twice ascended and descended Mt. Washington. Has ascended the highest peaks in the Yosemite. Holds the 25-mile Road Record in America.

Awarded Gold and Bronze Medals at the Paris Exposition, also a prize in the 1000-Miles Trial in England.

The "*Locomobile*" is simple, safe and practical. Economical and free from objectionable features. Immediate delivery Styles No. 2 and No. 3.



Style No. 2, $750. F. O. B. Bridgeport, Conn.

Send for Catalogue and interesting printed matter.

ADDRESS ALL INQUIRIES TO

The "*Locomobile*" Company of America,

11 BROADWAY, NEW YORK.

One of the Decorated Vehicles at Guttenburg

The Automobile
MAGAZINE

VOL. 11 OCTOBER 1900 NO. 7

Three Notable Motor Carriages

THE Shah of Persia is probably the first notable from the Eastern countries to use an automobile, and will probably astonish the natives as well as be the recipient of many prayers for his protection from accident with the new foreign invention. His visit to the Paris Exposition showed him so many of the new vehicles, as well as their advantages, that he could not forego the temptation to have some of his own. He decided on the steam vehicles of M. Leon Serpollet, and the one shown has already been shipped. It is an eight horse-power double phaeton and is equipped with the latest type of Serpollet boiler.

The Right Honorable A. J. Balfour's choice fell on a De Dion voiturette, as shown. Report has it that he is so highly pleased with its workings that he has ordered another for his daughter, who has handled it herself to considerable extent. The one shown is painted dark green with fine white lines and is upholstered in dark green morocco.

Mr. Oliver Stanton has the new twelve horse-power Daimler carriage shown with this article. The motor is of the four cylinder type with a gravity feed for fuel and pressure feed for lamps. Mr. Stanton is well known in England as being the instructor of the Prince of Wales in his automobile ventures, as well as a general mentor for notables with similar tendencies. It will be seen from the above that the automobile is fast making friends among the nobility and royalty of European countries. It does not seem to make any difference who enters the ranks of the automobilist; it fascinates all alike, and the sensation one's first experience brings is delightful.

One of the Decorated Vehicles at Guttenburg

The Genesis of the Automobile

By Dr. A. Neuberger

SO suddenly has the automobile sprung into prominence that many of us are apt to look upon it as one of the remarkable and startling products of an inventive age. But the automobile is by no means new. Horseless carriages are old, very old, and can be traced back to early times. At the beginning of the century, it was by no means uncommon to see an automobile, driven by steam, winding its way through the streets of London.

Carriage of the Shah of Persia

The history of the automobile is interesting because it teaches us something of a technical problem which long baffled many a keen mind and which at last seems to have been solved just as a new century is dawning. If we examine the monumental records of the human race, we find carved upon the stone memorials of the Egyptians, a wagon or chariot driven by the repellant force of a jet of steam. Whether the vehicle was ever actually built or whether it was the idea of some brilliant inventor born out of his time, archeologists have not been able to determine. Be that as it may, at all events these graven records of a by-gone day prove that the idea of a wagon propelled by some mechanical means was known in the time of the Pharaohs, and that the

realization of this idea was attempted by a method, which technically considered, was far from being the worst that could have been chosen. With the fall of the Egyptian Empire, the automobile seems to have disappeared for a time from the memory of man. It is not until we come to the Roman Emperors that we find traces of the automobile in the documents which have been handed down. There must have been some mechanically-driven vehicle in the time of the Emperor Pertinax (192-193 A. D.), for we find in the well-known life of that Emperor a passage which reads: "Emperor Pertinax sold everything which belonged to his predecessor, Commodus, and among other things, newly-invented wagons in which a very ingenious but complicated mechanism automatically turned the wheels and

Voiturette of the Right Honorable A. J. Balfour

simultaneously operated fans which served to cool the driver. The wagons also indicate the distance traveled and the time elapsed." These wagons may possibly have been devised by Hero of Alexander, a well-known physicist who constructed a great number of mechanical contrivances and scientific toys. In the fragments of his writings which have come down to us he describes methods of building motor carriages. It is not very certain when Hero lived. But it is generally agreed that he flourished between the first and second centuries A. D.; so that the theory that he was the builder of the chariots of Pertinax may have some foundation. With Hero and Pertinax the automobile seems again to have been lost. But in the writings of the scientist-monk, Roger Bacon (1214-1294), mention is again

made of wagons "which were moved only with the help of science and art, without the use of beasts." The passage is very obscure; nothing is said of mechanical construction. Nevertheless it can hardly be doubted that Bacon had a dim idea of an automobile.

The first motor-carriage which is actually known to have been used was that constructed in 1649 by John Hautzsch, a Nuremberg watchmaker. The vehicle was driven by a clock-train; and although the spring had to be wound up at intervals of a few minutes, it managed to crawl along at a speed of one mile per hour. Although its swiftness of motion was not very startling, the carriage met with the royal approval of Prince Karl Gustav of Sweden, who bought it for $500. In 1663, the

Mr. Oliver Stanton's New 12 H. P. Daimler

celebrated Isaac Newton also built an automobile which, like its Egyptian predecessor, was driven by the recoil of a jet of steam.

By the close of the eighteenth century, a number of automobiles were in use, all of them clumsy, heavy, and slow. In Augsburg an unknown craftsman built a wagon driven by steam and human power, which carried a cannon and three artillerymen. A similar vehicle was constructed in 1765 by Nicolas Cugnot for the Marshal of Saxony which seemed to have a will of its own; for on its first trial (which was also its last) it ran against a stone wall, despite all the efforts of its driver to guide its course, and completely destroyed the masonry. In 1771 Cugnot built a better machine, which was to be used in the transportation of artillery. The inventor of the steam-engine, James

Watt, devoted his attention to the construction of an automobile, and although he did not carry out his own ideas, nevertheless he lent his assistance to William Murdoch, to whom our modern system of gas-lighting is due. Murdoch, in 1781, succeeded, with Watt's help, in producing a tricycle driven by steam. Evidently the inventors to whom the modern motor-carriage owes its origin, were men of prominence in the mechanical world.

Passing over the awkward contrivances of Evans (1786), Symington (1786), Previthik (1802), and others, we come to the vehicle invented by a man to whom, more than any other, the automobile is due, Sir Goldsworthy Gurney. In 1822 he built a steam-carriage with which he even climbed hills. His ideas were further developed by Walter Hancock (1799-1852), whose heavy omnibuses, each with no less than six smoke-stacks, ran merrily along the highways of England. I have an old caricature before me, printed about 1828, in which a Gurney carriage is pictured in the midst of a crowd of people, running over a woman and dragging a young girl to death. The caricature was certainly uncalled for; as a matter of fact, but a single accident can be traced to the Gurney omnibus—an accident which suddenly checked the development of the automobile in England. The accident in question occurred in June, 1834, on the road between Glasgow and Paisley. As a result, the railway-companies, who had long been enviously watching the rapid strides of automobilism, forced a bill through Parliament, which stipulated that a man carrying a red flag was to walk before every "road locomotive" and that the speed was not to exceed four miles per hour. Naturally the enforcement of such a law completely checked the development of the motor-carriage.

Other countries took up the cause of automobilism. France seems to have been most interested in the efforts of inventors to provide practicable automobiles. But the vehicles were all driven by steam, and the necessity of providing sufficient boiler-space and fuel capacity had the effect of rendering the construction exceedingly cumbrous. In was not until the early seventies that the automobile began to assume the form to which we are gradually becoming accustomed. About that time the well-known manufacturers, De Dion et Bouton, were beginning to build vehicles driven by steam, which were lighter, more elegant and graceful than the awkward contrivances of Gurney's day. With the invention of a benzine carriage the future of the automobile seemed assured. But its inventor, Pierre Ravel, who received a patent for his contrivance, was compelled to wait many a year before his dream was realized. As he completed

his model, war broke out between France and Prussia. His model was kept in an out-house, which was on the Parisian line of defenses. One day, officers appeared, who gave orders to have the out-house pulled down, in order to make room for fortifications, under which the first benzine automobile to this day lies buried.

The automobile of the petroleum type was first made a practical success by Gottlieb Daimler, of Cannstatt, Germany. He it was who devised the first benzine-motor with ignition devices that were reasonably trustworthy. He patented his invention in 1883. The firm of Benz & Co., of Mannheim, soon after also began to produce benzine-motors, which, following Daimler's example, they applied to carriages. The vehicles which the company patented in 1886 are essentially similar to our most recent motor-carriages of the petroleum type.

Restrictions for Automobiles

IT would seem as though park commissioners and others who have it in their power to make life miserable for owners of new vehicles, would learn from the experience of their predecessors of, say, twenty years ago. But judging from the rules and regulations we find in many places this does not seem to be the case.

Those who rode bicycles in the early days, when high wheels were the mark of up-to-date wheeling, remember the idiotic and ludicrous regulations which were made in various places and the attempts to keep it off the highway. Prospect Park, in Brooklyn, allowed wheels only on the walks and paths—the very places they had no business to be.

Gradually both horses and commissioners came to their senses, and the special restrictions were removed, leaving only the very proper one regulating speed.

But with all the experience with the bicycle the park commissioners are using the same tactics with the automobile and trying to bar it from the parks just as they did the bicycle. Of course, the attempt will fail, but it is almost pitiful to see the commissioners bucking against the same wall twice in such a few years. They seem to have forgotten the former fiasco and must have a fresh example.

One, Two and Three Track Auto Vehicles

THERE seems to be a growing tendency toward three-wheel automobiles, and they certainly have advantages for what may be called local use. It would seem that for touring where all sorts of roads are encountered the four wheelers were better suited, as they only have two tracks and follow the ordinary carriage closely. The third wheel takes the horses tread.

Bicycle motors are also gaining ground and for individual touring possibly have advantages over any other vehicle, for side paths can be ridden as with the regular bicycle.

But for solid comfort the four wheeler has good points all its own, and will be the favorite with most people. This is especially true where the owner enjoys the company of wife, sweetheart or friend, and is not built on the hermit order.

Rights of Motor Vehicles

THE question as to the rights of a motor vehicle on a public highway was raised in the Bergen County Court at Hackensack, N. J., recently, and Justice Jonathan Dixon, of the New Jersey Supreme Court, in charging the jury, interpreted the law bearing upon the issue raised. As the question depends not upon the construction of statutes, but upon the application of principles of common law, the Justice's analysis applies with equal force in any State.

The suit was for damages for the death of Mrs. John L. Guyre, who died from injuries received by being thrown out of her carriage at Midland Park, N. J., her horse having taken fright at a motor vehicle operated by Dr. William L. Vroom. After taking twenty-three ballots the jury reported its inability to agree upon a verdict.

The prosecution having made the contention that the motor vehicle was a nuisance and had no rights upon a public highway, Justice Dixon charged as follows:

"The question is whether the machine driving along the country roads without a horse in front and discharging steam

behind is so likely to frighten a horse on the highway and thus endanger the road as to constitute the machine a nuisance.

"It is argued that it is an improved method of locomotion, but it does not follow that it is to be tolerated. The right to drive horses along the highway is an established right, a common right, and if a modern method of locomotion is used of such a nature that it commonly brings discomfort and danger to those exercising the common right, the established right of travel on highway, then it is a nuisance and cannot be tolerated.

"But it does not follow it is a nuisance because it occasionally or exceptionally frightens horses. That would not make it a nuisance. In order to make it a nuisance its common effect must be to substantially interfere with the people who drive horses along the highway.

"Is it of such a nature that it is so likely to frighten horses and thus endanger travelers on the highway as to make it a nuisance, or is it only its exceptional effect? If it is its common effect, then it is a nuisance, if exceptional effect, it is not a nuisance.

"If this method of locomotion is a common nuisance, and was the approximate cause of death, then the defendant is responsible."

My Neighbors and Their Automobiles

By Isaac B. Rich

SEVERAL of my neighbors have purchased automobiles, no two alike, and, of course, they are all the best. In fact, when you are with Jones you are dead sure you wouldn't buy anything but a Winton—couldn't be anything half as good, anyhow. Brown, on the other hand, has a Locomobile, and when I ride with him that's the only machine on earth. Always ready, just right in every way. But White has an electric runabout and delights in telling me that's just what I want. Takes me to ride to prove it and almost does it.

Now, Jones, Brown and White are nice fellows, careful men all three, and seem to get along nicely with almost anything and everybody. When I ride with them everything goes as it should, and I'd be willing to take either of the three machines and get along—or try to.

But I have other neighbors not so fortunate. Mr. Larkin has a gasoline motor—which shall be nameless, though it's no fault of the machine itself—and he has a circus every time he goes out. I've never been out with him, but a friend of mine told his experience about like this:

"Larkin asked me out with him and I went over with great anticipation—likewise my best clothes. 'Jump in,' says Larkin, 'and we'll be off soon as I start the motor,' and he grabbed a handle and wound it around a few times—but she didn't start. 'Wonder if I turned on that oil,' says Larkin, and he goes behind to investigate. 'Forgot it,' says he, and winds away at the handle; still no movement of the motor.

"'Rather aggravating,' he mutters, with an adjective in front, 'just when I want it to go. Well, by jinks, if I didn't forget to turn on the spark; course she wouldn't go. Third time fixes it, and here we go,' as the motor gets to work and he climbs into the carriage.

"Everything went nicely until he got rattled at a street car and a balky horse, and then he had the machine backing before I knew what was up—or he, either. But that's his way; did just the same with a horse and can't expect him to change just because he has a new carriage."

Mr. Baldwin, on the next street, has a steam carriage, and he is always in trouble. Not because it's steam, but because it's Baldwin. When he drove horses he killed three in one summer and then wonders why his automobile costs so much for repairs. Why, he don't break his neck is a mystery to all of his friends. He will probably go back to horses next year—until he kills a few more or the society with the long name makes it uncomfortable for him—and then he'll try autos again. If I were selling motor carriages I'd fight shy of such customers, as they don't help any machine; hurt it, if anything.

There is another neighbor, too, who needs mention—quite a lot of the residents of Riverside have them, you see—and he is Mr. Jewett. Now, Jewett is a nice fellow—like him in almost every way, but he is one of these amateur mechanics you read about. He can drive a nail without bending it or smashing his finger over one shot in five; can saw a board without breaking the saw, and fixes all the clocks and the sewing machines in the house—so they don't go. Then his wife gets a tinker to come during the day and gets things straight again, and all is lovely in the Jewett household.

Well, Jewett is also something of an electrician, and nothing would do him but a storage battery runabout. He bought it—

and the makers wish he hadn't. He's improved (?) it in so many ways that his wife says she's never sure of getting home the same day. He has the motor apart and the battery connections loosened up to see if they are corroded (generally forgets to tighten a few, which makes it interesting when he starts out), and, in short, he does what most amateur mechanics do with any machine—tinker it to death. If I sold a machine to a man of that kind I'd want to put a time lock on every part and have it open once a year for general overhauling.

When I get a machine myself I expect the neighbors will pick out my weak points, just as I have theirs.

A Good Way of Dealing with Objectors

MR. ALBERT C. BOSTWICK, well known to all automobilists, has taken a very sensible stand in regard to the objections raised to his vehicles in Mamaroneck. He offers to have any horse trained not to fear motor vehicles if the owners will bring them to his estate at Orient Point.

Mr. Bostwick's letter in the local paper contains some good advice to drivers. He says:

"If people would pay a little more attention to their horses and less to my automobiles when passing, they would have better-behaved horses the next time they meet one.

"You are no doubt putting the automobile in the same class as the horse, and think it cannot be stopped as quickly, its direction changed, and people in the street warned of its approach as quickly. If, however, you would like to make a bet that I cannot bring my car, going at a speed of fifteen miles per hour, to a dead stop as soon as a horse and wagon going ten, I would be very glad to accommodate you, and would consider it a good way of impressing it on one's mind. I would also like to make a bet that I can drive a car through obstacles placed in the road at a greater rate of speed than a horse-drawn vehicle.

"The introduction of the motor vehicle is an important step in the advancement of road locomotion, and as such deserves to have the help of everybody, and especially of the press, which does so much to get people's minds started in either the right or wrong direction. It should be clearly shown how easily it can

be steered and controlled, how capable it is of making long trips, if properly taken care of, and how few accidents occur from automobiles as compared with those resulting from horses, taking into consideration the number of automobiles as compared with the number of horses."

The Guttenburg Races

THIS was one of the best contests yet held in this country, the mile track at Guttenburg (N. J.) being a decided improvement over the half-mile course at Newport, and allowing better time to be made. Then, too, the famous Panhard machine, formerly owned by M. Rene de Knyff, but now the

Mr. T Walsh, Winner of Race for American Machines

property of Mr. Albert C. Bostwick, made its first appearance on American tracks. This seems to be the fastest four-wheel machine in the world (a broad statement, but apparently borne out

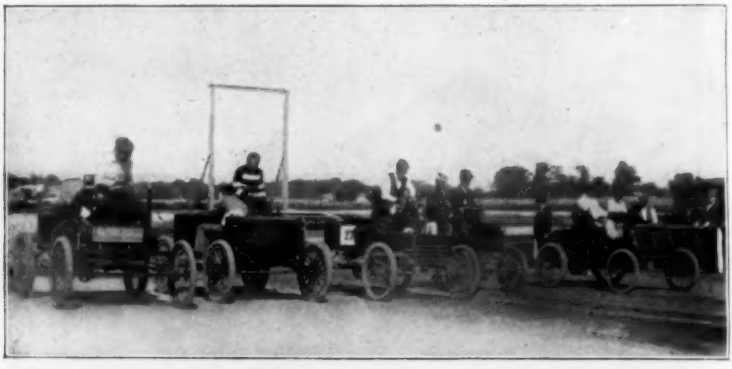
by facts), being capable of developing twenty-four horse-power when necessary.

That Mr. Bostwick does not intend to let the laurels of his famous Panhard grow dim, is shown by his operation of the machine in this race, where his daring, yet successful, running won him the admiration of all.

While there were a few trifling accidents, there was not a single case of serious damage to machines or any collisions.

To be sure Mr. Riker blew out a fuse on his electric machine and Mr. Hibbard broke a chain on his steam-driven carriage, but these are easily remedied and would not delay one long on the road; in a race it is different, of course.

The race for gasoline machines of American make was won by T. Walsh, New York, in 10 minutes 10⅖ seconds; F. Nagel,



American Machines Ready to Start in the Five Mile Race

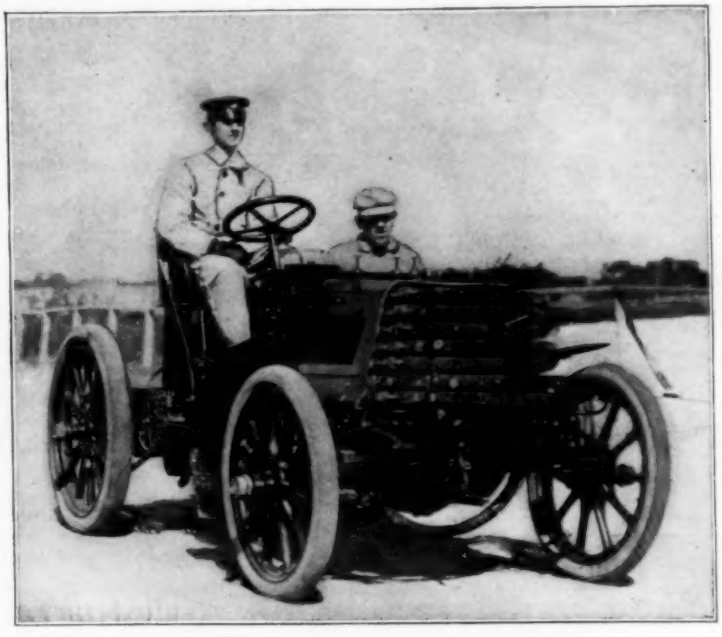
New York, second, in 11 minutes 3⅗ seconds; Albert C. Bostwick, New York, third, 11 minutes 13⅘ seconds; J. Rauchfuss, New York, fourth, 12 minutes 15⅕ seconds. First and second men in this and all other classes were entitled to compete for the open ten-mile championship.

The five-mile race for gasoline machines weighing under 1,000 pounds was won by Cornelius J. Field, Brooklyn, time, 11 minutes 43⅗ seconds; F. D. Craven, New York, second; J. Louvegnez, third; C. S. Henshaw, Brooklyn, fourth. Mr. Field won this race easily, using a De Dion voiturette.

The five-mile race for gasoline vehicles weighing over 1,000 pounds was won by Albert C. Bostwick, New York, time, 7 minutes 43⅕ seconds; David Wolfe Bishop, Newport, second, in 8 minutes 30⅘ seconds. These were the only starters, the only

other machine now in this country which could make a showing being William K. Vanderbilt, Jr.'s German Daimler motor. This was Mr. Bostwick's first official test in this country of his Panhard car.

The five-mile race for steam vehicles was won by W. S. Stewart, Newark, time, 11 minutes 48 seconds; W. L. Hibbard, Bridgeport, second, 11 minutes 48⅕ seconds; S. Huston, New York, third. Robert Dairs, New York, did not finish. This



Albert C. Bostwick in his New French Panhard Racer

was the best race of the day, as can be seen by the times of first and second, only about a yard separating them at the finish.

The five-mile race for tricycles was won by C. S. Henshaw, Brooklyn, time, 8 minutes 24⅗ seconds; J. Louvegnez, Brooklyn, second, in 9 minutes 46⅗ seconds; S. R. Atkinson, New York, third. F. D. Craven did not finish.

The race for electrical vehicles resulted in a walkover for A. L. Riker, who went one mile to qualify for the championship race. Mr. Riker's time was 3 minutes 16⅕ seconds.

The ten-mile championship for all classes was won by Albert C. Bostwick, time, 15 minutes 9⅕ seconds; David Wolfe Bishop second, in 16 minutes 43⅖ seconds. A. L. Riker and W. L. Hibbard did not finish on account of the accidents above described. Mr. Riker led at one mile, finishing in 1 minute 46 seconds; then Mr. Bostwick took the lead and held it to the end, averaging about 1 minute 30 seconds for each mile, or about forty-five miles an hour for the full distance. The speed was so great that both Mr. Bostwick and Mr. Bishop could not keep the carriages near the curb in taking the turns, and to get around

The Waverley Brake

safely at all both had to slow up. The big machines slid sideways even at that at this part of the track, and had one overturned no surprise would have been felt. Mr. Bostwick made his fastest mile, the last one, in 1 minute 27⅕ seconds, and declares that he does not care to go any faster on a mile track. His companion in riding (every machine being compelled to carry two persons) spent nearly all his time during the race in crouching and leaning out toward the inside of the track, being given this seat purposely so that he could render such service. There surely were times when Mr. Bostwick's machine was taking curves that but for the ballast the machine would have turned over. Taking every-

thing into consideration, the races furnished as much valuable experience for those who took part as they did excitement for the spectators. Following is the summary of the ten-mile open class race, the figures constituting best records for a mile track:

Mile.	Leader.	Time.	Mile.
1.	Riker	1m. 46s.	1m. 46s.
2.	Bostwick	3m. 20⅘s.	1m. 34⅘s.
3.	Bostwick	4m. 49s.	1m. 28⅕s.
4.	Bostwick	6m. 18s.	1m. 29s.
5.	Bostwick	7m. 47s.	1m. 29s.
6.	Bostwick	9m. 15⅘s.	1m. 28⅘s.
7.	Bostwick	10m. 44⅗s.	1m. 28⅘s.
8.	Bostwick	12m. 12⅗s.	1m. 28s.
9.	Bostwick	13m. 41⅖s.	1m. 28⅘s.
10.	Bostwick	15m. 9⅕s.	1m. 27⅘s.

About thirty horseless vehicles of all kinds took part in the parade; R. M. Barwise's golf trap taking the prize for the best appearance, and Miss Menken, on an autocycle manipulated by D. C. Goodman, winning the prize for the best decoration. The obstacle race was won by David Wolfe Bishop. The next automobile races will be at the Inter-State Fair, Trenton, N. J., September 24 to 28.

A machine which attracted considerable attention was the break shown in accompanying illustration, a product of the Waverley Factory, at Indianapolis.

The machine has a seating capacity of eight passengers and the operator. It is driven by electricity, and a very noticeable feature of the vehicle is the absence of noise in its operation. This is largely due to the special form of gear used, it being a spiral tooth gear, used only by the company mentioned.

A single motor with compensating gear is used, having forty-cell battery. It is of the multipolar ironclad type, dust proof and self oiling.

It has a powerful band brake, which is actuated by a foot lever, a ratchet device enabling the operator to lock this brake in cases where it is desired to leave the vehicle standing on an incline. An auxiliary electric brake can also be fitted capable of stopping the machine in its own length when running at full speed.

The wheels are fitted with solid rubber tires, and run in ball bearings, with a very efficient scheme for oiling.

As shown by illustration, the steering is accomplished by a wheel, the action of which is very positive.

The gearing is of phosphor bronze with steel pinions.

The frame is made of tubular steel, with forged connections and brazed at each joint. This makes a very strong frame and one capable of resisting extraordinary strains.

The arrangement of the fifth wheel is such as to relieve the frame from all side strain.

The vehicle presents a light appearance, and its lines, for a machine of its size, are very graceful.

Waverley Electric Runabout

It was awarded first prize for appearance in the parade, in which about thirty vehicles took part.

The other illustration shows an electric runabout, which won second prize for the best decoration. This is also a Waverley machine. It is fitted with a motor of 2½ horse-power, and can be run thirty miles on a single charge. The machine is extremely simple in its operation. The young lady shown seated is Miss Eva Mudge, of New York, and while the machine failed to capture first prize, it was accorded great applause.

Importation of Machines Abroad

A REPORT has recently been made which gives the total number of automobiles imported through the different ports of Great Britain during the month of July last. The port of London alone has received 70, of which quantity 41 were received from New York, 5 from Ostend, 13 from Anvers, 3 from Rotterdam, 4 from Paris, 2 from Brussels and 2 from Hamburg. The places where the machines were received from were not, naturally, the places of manufacture, but the ports of exportation. The port of Liverpool, on its side, has received one automobile from New York and another from Hamburg. For the other ports of England we may say that in them all there has arrived: 1 from Calais, 1 from Cologne, 1 from Antwerp, 50 from Dieppe, 2 from Havre and the same from New York.

It will be seen from these figures that the American industry in the manufacture of automobiles is already making its mark abroad. There is every indication that within a few years our makers of this kind of machines will have a market in Europe and the British Colonies. France had the start in this line of industry, but our makers are achieving such good results that our export trade will exceed that of France in a few years.

Some Results at Chicago Races

THE International Exhibition and Race Meet held at Chicago last month proved a success. The novelty of motor-vehicles on exhibition was very large and extremely keen interest was manifested in the races, particularly in the contest between Messrs. Winton and Skinner.

It is said that at the close of the exhibition many sales of vehicles were effected, and in some cases purchasers bought machines and rode home in them, some of them coming from a considerable distance. Persons who were likely to purchase were treated royally to rides about the grounds.

One of the prominent features of the racing was the wonderful performance of the Winton gasoline motor piloted by the designer. This machine came in first in the ten-mile race, covering the distance in sixteen minutes 2 seconds. It was also first

in the twenty-mile event, the time being thirty minutes thirty-one seconds, while it traveled fifty miles in the record making time of one hour, seventeen minutes and fifty seconds, an average speed of thirty-eight miles an hour.

Unusual speed was made by Albert Champion and Kenneth A. Skinner on double motor tricycle and De Dion racing tricycle, respectively.

In the manufacturers' parade, which had very few entries, the first prize was taken by Hewitt-Lindstrom Motor Co. for the largest number of practical designs. This company was also awarded second prize for having the greatest number of machines in line. For the most practical design the Woods Motor Vehicle Co., of New York and Chicago, was awarded third prize.

In the second event, a mile run for steam vehicles only, M. T. Griffin, who rode in a locomobile, came in first, the time being one minute thirty-nine seconds. In another mile race confined to gasoline motor vehicles Arthur J. Eddy, with a Winton road wagon, came in first. Time, two minutes nineteen seconds. In a similar race for electric vehicles a Hewitt-Lindstrom runabout came in ahead. Time, two minutes thirty-four seconds.

There were eight starters in the ten-mile race, in which, as already stated, A. T. Winton was victor, all the others dropping out.

The five-mile race for members of the Chicago Automobile Club was won by J. W. Bate; time, fourteen minutes thirty-two and one-fifth seconds.

In the ladies' two-mile race for private owners, Jeanette Lindstrom, the thirteen year old daughter of Charles A. Lindstrom, was the winner, covering the distance in a Hewitt-Lindstrom electric vehicle in seven minutes twelve seconds.

An event which caused unusual interest was the fifty-mile race between Messrs. Champion and Skinner, in which Champion was declared winner, his time being one hour fifteen minutes fifty-seven and two-fifths seconds.

The ten-mile manufacturers' race was won by the Locomobile Company's machine, the time being twenty-one minutes thirteen seconds.

There were other events of somewhat less importance. Wet weather prevailed generally, making the track dirty, as well as doing much to prevent a larger attendance.

The Prince of Wales and the Serpollet Motor-Car

THOSE who recall the early efforts of motor carriages know that M. Leon Serpollet was one of the pioneers of steam-driven vehicles. Of late he has been gaining distinction as an instructor of Kings and Princes in the art of automobilism and has had the distinction of accompanying the Shah of Persia

The Prince of Wales in M. Serpollet's Steam Carriage

on his first drives, as well as the Prince of Wales in the carriage shown above.

M. Serpollet reports that he found the Prince an excellent passenger and was charmed with his reception. He had an agreeable surprise in being presented with a beautiful scarf pin after lunching with the Prince, who took a second ride the following day.

Changing Seating Capacity of Automobiles

By R. E. Marks

AS the average user of the automobile is not a millionaire the question of getting a carriage for all around use is quite an important one. Having a horse, it is not very expensive to have two or even three vehicles, a runabout or a Stanhope, a surrey and possibly a wagonette, or something similar, as the cost of each is not excessive, and the same horse or horses may be used in all cases.

But with the motor carriage it is different, for the "horse" is part and parcel of the carriage and not many of us want to invest in two or three automobiles.

For our own use a Stanhope or voiturette is just what we need, but when our friend Brown and his wife come to see us from a nearby suburb we are in a pickle. We want to show them the beauties of our particular town and its numerous advantages over theirs and we also want the Browns to know what a fine carriage we have and how well it runs.

To be sure I can take Mrs. Brown with me and hire an ordinary horse and buggy for Mr. Brown and my devoted wife, or we can let the two better halves drive together in the aforementioned antedated vehicle. But as Brown used to be a suitor of our own beloved and we only beat him by a narrow margin from getting her, the former arrangement isn't quite to our liking, while with the latter there is always the possibility of the weak-minded horse taking fright and causing a smash.

What we need is a surrey to hitch our motor to, but as the maker hitched it pretty effectually to the Stanhope or voiturette this is out of the question. So I show Mr. B. the automobile and discourse on its beauties and advantages and express regret that it hasn't room for four.

Seriously, though, there is a field for a style of body which can accommodate two extra on special occasions, and I believe at least one firm is seeing this and has a design out which allows it to be done.

The size of the motor, of course, prevents obtaining the same speed with four as with two, but we never expect a horse to do as well with a surrey as with a runabout, so there need be no change in the motor part of the machine.

For the average man who will use an automobile for pleasure or business the question of seating capacity is quite a serious one.

Actual Cost of Steam Motor Wagons for Street Watering and Dirt Removal

ALTHOUGH it is quite a drop from the excitement and exhilaration of the racing automobile to the plebeian steam watering cart, the question of dollars and cents in their operation is always a live one for those who contemplate using them in a business way. A paper was read on this subject by Mr. E. Shrapnell Smith at the annual meeting of the Association of Cleansing Superintendents of Great Britain, at Salford, on August 30. He said:

"At the Birmingham Congress of the Sanitary Institute, two years ago, I read a paper entitled 'Some Sanitary and Allied Advantages Attending the Introduction and Use of Motor-Vehicles,' and at your own Congress at Glasgow last year I read a second entitled 'The Application of Mechanical Power to Street Cleansing.' On each of these occasions I was rewarded by a unanimous resolution in favor of the adoption of self-propelled vehicles in place of animal haulage, and one may, perhaps, be excused for inquiring as to the *raison d'être* of a third paper. Two replies suggest themselves in explanation. The first is that, the motor-vehicle industry being a new one, fresh data will probably have accumulated in an interval of twelve months. The second is that a few more facts will not fail to have their effect in deciding authorities who are at present in doubt. These contentions are certainly sound, for the experiences of the last twelve months are most important and in close agreement with previous estimates; in fact, it would have been a source of subsequent regret to me had I neglected this opportunity of speaking for the movement whose good I have at heart. And here I may venture to remind you that I have no connection with any firm manufacturing motors, my position as Hon. Secretary of the Liverpool Self Propelled Traffic Association being contingent upon perfect freedom. Consequently I feel that you will have confidence in my views and in the absence of bias or prejudice from any opinions I may express."

He then referred to the very damaging reports made by Mr. Arthur Ramsden, the Surveyor of Chiswick, on the cost of motor vehicles there, and continuing says:

"These data look very bad for the motor, but they are no criterion of the results that have been obtained since the two motors were purchased in June, 1897. Furthermore they are incomplete, even for the period embraced, without an explanatory statement respecting local circumstances. Mr. Ramsden, who is a firm believer in the economy of mechanical cleansing, has supplied me with facts which place an entirely different complexion upon what, at first sight, admits of nothing but a construction adverse to the motor. I have collated these facts in tabular form:

Year Ending March 31.	Estimated.		Cost of Dusting.
	Population.	Houses.	
1895	23,982	4,796	£1,400
1896	24,582	4,916	1,065
1897	25,000	5,000	1,545
1898	25,972	5,195	1,253
1899	26,772	5,354	1,410
1900	27,772	5,554	1,809

The first motor began work on August 14, and the second on November 6, 1897. The horse contractors' tender for the year ending March 31, 1898, was £1,900, whereas the actual expenditure was only £1,253. Thus the motors, for which £350 each was paid, effected a saving of nearly their prime cost in the first six months of their employment. At the end of this period the Surveyor referred to the motors as follows in his annual report: 'I am very pleased to say that they have in every respect answered what I foreshadowed in my last year's report. Owing to the rapid growth of the parish, coupled with a large decrease in the number of empty houses, the amount of dust to be removed has increased considerably, and I should strongly recommend the purchase of another steam tip-wagon, which could be used as a slop cart, dust cart, or water cart.' Now, since the horse contractors' tender for the year ending March 31, 1898, was £1,900, it is pretty certain that it would not have been reduced for subsequent years, when provender and other stores had advanced in cost. Three years' work at this rate would have amounted to £5,700, whilst the recorded cost has been £4,472.

Will anybody quarrel with a departure that has reduced the cost of dusting by £1,228 in thirty months, notwithstanding a mean annual growth of the district by 185 houses? But this does not dispose of the high costs of the motors during the last

year. I have made careful inquiry into the falling off, and have come to the conclusion that the motors are now worked at not more than about half their capacity, even for the single shift during which they are out. The mileage is only seven per day, and not more than three loads are collected. Furthermore, there appears to be steady obstruction by horse interests in the Council, whereby order for repairs are delayed, and the motors obliged to spend days, and even weeks, in enforced idleness. In addition, the motor performs services which are not included in the statement of dust collection. These are, particularly, carrying five to six ton loads of slop on Sundays and on other occasions, a matter which will soon add, say, 100 tons to the weight stated in the published results. Again, until a few months ago the motors had to run over about 300 yards of an uneven sleeper track leading to the tip, which seriously strained the connections and mechanism, whilst it saved the Council 2s. 6d. per ton for barging. Lastly, the two motors are of the earliest type, now relatively obsolete, and I cannot comprehend the parsimony of the Chiswick Urban District Council in not getting rid of them and purchasing two modern ones, such as that now at work for the Strand Board of Works, with which I deal later.

I had hoped to refer at some length to the costs of working at Liverpool and Chelsea. Mr. John A. Brodie, the City Engineer of Liverpool, has been using a vehicle, built by the Lancashire Steam Motor Company, Ltd., Leyland, for eighteen months, but has so far given it work upon the conveyance of four-ton loads of tramway material and other heavy stores. The working has proved satisfactory and highly economical, but has no reference to watering or dusting. Mr. T. W. E. Higgens, Surveyor to the Chelsea Vestry, has had a Thornycroft motor at work for six months. This was purchased from the makers at a reduced figure, on account of its not being a new vehicle, and was fitted with watering and dusting bodies, but Mr. Higgens, like Mr. Brodie, has found the motor so useful for carting four-ton loads of stores, flagging, cement, etc., that, whilst it has at times done the work of four vans in watering the King's road, Chelsea, no dusting has been done. Partly in consequence of this splitting up of the work, and for other reasons, Mr. Higgens informs me that he is not publishing any figures at present. The Chelsea Vestry have also ordered two motors from the Lancashire Steam Motor Company, one of which was delivered two weeks ago, whilst the other is nearly ready for delivery.

I am indebted to Mr. Arthur Ventris, Engineer and Surveyor to the Strand Board of Works, for detailed information upon the working of the Board's Thornycroft motor between February 5

and August 4 of this year. The records are divided into three periods, viz.:

First—Motor on hire from February 5 to March 31, say eight weeks, used in dust collection only.

The motor was then sent to the makers' works, where it remained for the month of April for overhaul, painting, and the construction of new tipping and watering bodies. It was then purchased complete, with two bodies, for £750.

Second—Motor working from May 1 to June 18, say seven weeks; used in dust collection only.

Third—Motor working from June 19 to August 4, say seven weeks; used in dust collection between 6 A. M. and 11 A. M., in street watering between 11 A. M. and 6 P. M., and in flooding the street (preparatory to the flushing by fire hose) between 11 P. M. and 5 A. M.

The performance obtained has been as follows:

Period.	Work.	Weight of Dust Collected and Tipped.		Watering.		Flooding.	
		Total.	Weekly Average.	Days.	Loads.	Days.	Loads.
		Tons.	Tons.				
First	Dusting—6 A. M to 6 P. M....	252	31.5	..	..	..	..
Second ..	" "	363	52.0	..	..	..	..
Third .. .	Dusting, watering, flooding, two shifts	189	27.0	25	225	37	777

It will be observed that better work resulted during the second period than was the case when the motor was on trial. This is due partly to increased experience in handling, and partly to the regular use of a trailing dust-van on one run per day. But the third period is the most interesting, and I pride myself that Mr. Ventris has followed the suggestion contained in my paper read at Glasgow last year. The motor is at work day and night, though the fires are drawn at 6 P. M. and relighted at 11 P. M., the duties being divided between two drivers. At present it is found necessary to have an assistant with the watering-tank body in the day time when the traffic is heavy, to work the levers controlling the water delivery, but Mr. Vestris thinks this extra man may be superfluous if a van is fitted with foot levers. The water tank has a capacity of 700 gallons.

Passing now to a comparison with horse work, Mr. Vestris points out that he has discontinued the work of three single dust carts, horses and drivers, and finds that the work is done

better and more speedily. The house dust, which is collected for the most part between 6 A. M. and 10 A. M., is very light, and the weight does not convey a correct idea of the labor in collection. I may say that the yearly average for the Strand district, exclusive of street and market sweepings, is 1,265 tons per mile of street per annum, whilst the bulk is 4,216 cubic yards. This gives an average weight of only 6 cwt. per cubic yard. The average morning run of the motor in this collecting is sixteen miles. In addition to this replacement, Mr. Ventris has discontinued the use of two water-vans, horses and drivers that were previously engaged in flooding the streets prior to the flushing by fire-hose at night.

The reduction of cost thus obtained is, per annum:

Hire of five horses and harness (feeding and stabling done by contractors), at £65 per horse	£325	0	0
Dust vans are owned by Board and used for other purposes	0	0	0
Hire of two water vans, at £16	32	0	0
Three drivers of dust vans, at £71 10s	214	10	0
Two drivers of water vans, at £84 10s	169	0	0
Oiling and repairing three dust vans, at £8	24	0	0
Third-party insurance on five vans	7	10	0
Total reduction in cost per annum	£772	0	0

The expenditure in respect of the motor has been:

First Period—Hire for eight weeks, at £7 10s. per week, for day work only, inclusive of all charges.

Second and Third Periods—These aggregate a clear three months. The appended table, supplied by Mr. Ventris, is in proportion, and may be relied upon as being the outcome of experience.

ESTIMATED ANNUAL EXPENDITURE.

Interest and return of capital, spread over ten years, say	£82	6	0
Fuel—36 cwts. per week, at 32s. per ton, say	150	0	0
Wages—			
Two drivers, at 37s. per week	192	8	0
Attendant to work levers of water van on day shift, at 25s	65	0	0

Repairs—Thornycroft's guarantee	£75	0	0
Lubrication and waste.....	20	0	0
Boiler insurance on £2,000.....	3	4	0
Third-party insurance	10	10	0
Total cost per annum.....	£598	8	0

The saving per annum is, therefore, £173 12s. per motor, when the capabilities of the mechanical vehicles are properly utilized, and the operations organized upon such excellent lines as one finds in the Strand district. Steam is the only power within the range of practical politics, and solid fuel, *i. e.*, coke or coal, is more economical than oil fuel. Prospective users must not be afraid of the high prime cost, for motors give results commensurate with the initial outlay.

I have every confidence in urging the adoption of motors for use in operations similar to those so admirably carried on in the Strand district. The warnings I would give are:

(*a*) Concentrate sufficient dustmen upon the motor to permit of its large capacity being taken advantage of.

(*b*) Arrange for all repairs to be made promptly, and for periodic tightening of the wheels in a hydraulic tire-setting machine.

(*c*) Work the motor two shifts per day."

This is a good showing for the motor wagon, and we hope to have other good reports in the near future.

A New Nine Horse-Power Motor Vehicle

WE present herewith half-tone illustration of a 9 horse-power gasoline motor vehicle from the factory of the Ohio Automobile Company, of Warren, O.

The engine on this carriage is a horizontal single cylinder four cycle engine, having a high compression and being variable in speed, and is very sensitive to control. The engine shaft is

The Packard Automobile

short, being connected with the clutch and gear shaft of a spring compression. This arrangement permits a slight flexibility, insuring against binding in any of the bearings.

The gasoline tanks will hold sufficient gasoline for a run of from 100 to 150 miles; this, of course, depending upon the condition of roads traversed.

The igniting apparatus used is the jump spark with induction coil. This system has given entire satisfaction on large numbers of machines, particularly of European make. Dry batteries are used, the amount of current taken being minimum.

The machine carries a single oil box of ample capacity to lubricate all important bearings.

The speed of the engine is controlled by means of a pedal which is operated by the foot of the driver. The two forward speeds, the reverse and the brake are all under the control of the driver by means of a lever at his right hand.

The wheels are fitted with bicycle type spoked wheels, with flat base. All the wheels are of the same diameter. The wheel bar is long while the gauge is standard wagon gauge, 4 feet 8½ inches. By the use of a single cross spring in front no side strain is brought on the frame by inequalities in the road.

To the inside of each rear wheel is fitted an auxiliary brake rim to which is applied a large brake shoe. Being independent of other mechanism this is an effective and safe arrangement.

The chain used is made of special nickel steel, and throughout the machine is constructed from the best material.

The machine is known as the Packard New Model 9 Horse-power Automobile.

Endurance Test of Motor Vehicles

IT is announced that an anonymous donor has offered the Automobile Club of America a cup valued at one thousand dollars, to be given for an autocar endurance test, the contest to be held in connection with the forthcoming Automobile Exhibition to be held in Madison Square Garden, this city, November 3 to 10. The contest, which is to be one of endurance only, is to be presented to the owner of the vehicle which makes the fewest number of stops in a run of six hundred miles. The course will be from New York to Hudson and back, a distance of two hundred miles. This will be covered three times by the competitors.

No time limit is fixed, although the speed at which cars are to be run will be subject to certain restrictions.

The result of such a contest will be looked forward to with considerable interest, and probably the run will reveal a number of weaknesses in the staying power of some of the vehicles which may enter. We think that over in France more attention has been paid to endurance tests of automobiles than over here, which fact probably makes this contemplated contest possess greater interest.

Parade of Automobiles at Philadelphia

THE parade of automobiles held at Philadelphia Saturday, October 6, had eighty-nine vehicles in line, as against sixty in the recent parade of the same kind held in New York. It was a parade of which its promoters had reason to be proud. It was also a success as an exhibition, showing, as it did, all makes, styles and variety of automobiles, locomobiles and mobiles propelled by electricity, steam, gasoline, etc.

The parade was held under the joint auspices of the Pennsylvania Automobile Club and the Automobile Club of Philadelphia. Captain John S. Muckle was Chief Marshal, with L. Goodman as chief aide; the aides were John L. Wilson, Henry J. Johnson, Frank C. Lewin, Dr. F. L. Sweaney and T. B. Entz, all members of one or the other of the two clubs named. The object of the parade was to celebrate the great victory won by the automobile after a long and hard fight with the Park Commissioners to gain admission to Fairmount Park and obtain the same privileges, rights and protection granted to other vehicles, including bicycles.

The route was down Broad from Walnut to Lombard, then up Broad to Diamond, out Diamond to Fairmount Park and through the park to Riverside, the intention being to come down the river drive past Lincoln Monument, and then in Spring Garden street to the starting point and dismiss, but so many vehicles either fell by the wayside or got too far behind climbing City Line Hill that the parade was practically broken up at that point. The Chief Marshal was at the foot of the hill and ordered all the vehicles to stop after reaching the top and wait for those having trouble to climb it. Captain Muckle says while he was at the bottom of the hill trying to keep the parade intact Mr. Samuel Gustine Thompson at the top of the hill gave the command to go ahead, so that when he reached there he found the line all broken up. Without a leader the automobiles started to race each other and branch out in different directions, with the result that the large crowds that had gathered along the river front and at Lincoln Monument to view the pageant were disappointed, the procession never reaching that point.

Park Commissioners David W. Sellers and Samuel Gustine Thompson rode in the procession, while the Mayor viewed the parade, seated upon a fine looking bay saddle horse, at Riverside

It is interesting to note that hundreds of horses were passed and that there was not a single accident nor a single case in which a horse was frightened by the horseless carriages. They were highly pleased at this, for it was because of the claim that horses would become frightened and many accidents would result therefrom that the automobile was denied admission to the Park for so long a time. After the parade both expressed themselves as pleased, and both were of the opinion that horses would get used to the automobiles, the same as to bicycles, trolley cars and locomotives.

The parade was a really attractive affair, and presented a novel sight, with scarcely any two vehicles in the procession looking alike or being built after the same pattern. Quite a number of ladies were out "mobiling," and no doubt they enjoyed the parade.

Among others in the procession showing attractive vehicles were Henry L. Meyer, Henry Elliott, Robert C. McCurdy, S. R. Weaver, James Elverson, Jr.; Thomas H. Straley, George E. Gosslers, Mr. and Mrs. George P. Spittall, Mr. and Mrs. Jules Junker, Charles Junker, Henry Benners, William F. Rudolph, Joseph K. Wharton, Charles E. Wright, Benjamin T. Seay, D. W. Webster, Charles L. Klauder, Edward M. Rosenbluth, E. W. Rosenbluth, Dr. Benjamin F. Busby, Charles S. King, T. C. Palmer, Alexander Russell, Louis Kolb, Maurice Loeb, E. H. Adams and Clifford Mackie.

Electric Omnibuses

THE experiments which have hitherto been made in this country in the direction of applying electric power to the operation of omnibuses, says the *Mechanical World*, of London, have related solely to vehicles equipped with storage batteries, but the trials in this respect have for various reasons been discontinued for some time past. In France, however, a system has been devised which dispenses with the employment of accumulators, and which, according to a paper read recently before the British Association, is actually in use in the environs of Paris at the present time. The system consists in the use of omnibuses fitted with electric motors and controlling gear, the current being collected from a pair of trolley wires supported on short brackets arranged on one side of the road. On these wires runs a two-

wheel trolley equipped with a small motor for its own propulsion, whilst the connection between the trolley and the motor on the omnibus is effected by means of a flexible cable attached to a pole on the roof of the vehicle. It will be understood from this that the trolley wires which are supplied with continuous current at 500 volts pressure furnish the current through the trolley wheels and flexible cable to the omnibus motor. The latter, by means of a rectifying arrangement of three collecting rings on the armature, and suitably connected with the winding, supplies three-phase current which serves to drive the trolley motor, the leads for this purpose being embedded in the flexible cable. It will be evident that except for the absence of rails as a track, the system is practically an electric tramway on the overhead double-trolley principle, with omnibuses substituted for tramcars. It is difficult to see what advantages the method possesses as compared with an electric tramway on the trolley system. It may be of interest as showing that electric omnibuses can be operated without the use of storage batteries; but if overhead conductors have to be used, preference will undoubtedly be given in this country to their employment in connection with tramways, and not in relation to omnibuses equipped according to the above-mentioned system.

The annual meeting of the Automobile Club of America, which at present has headquarters at the Waldorf-Astoria, this city, will be held October 22, when new officers for the ensuing year will be elected.

The following nominations have been made by the Board of Governors: President, Albert R. Shattuck; First Vice-President, Gen. George Moore Smith; Second Vice-President, J. Dunbar Wright; Third Vice-President, David Wolfe Bishop; Treasurer, Winslow E. Buzby; Secretary, Whitney Lyon; Governors for Class of 1903, Dave H. Morris, Albert C. Bostwick, Charles P. Doelger. Notice has been given to members of a few proposed changes in the by-laws, these changes being unimportant and relating only to the conditions and wording of proposals of new members. Among these is one to make the membership section read as follows: "Each candidate for active membership must be proposed and seconded in writing and must be personally known to the proposer and seconder, both of whom shall be members in good standing." It has been decided to create a place of working secretary; F. W. Toucey, who has been associated with the Automobile Club of Great Britain, being spoken of for this position. Mr. Toucey had charge of the automobile 1,000 mile endurance test in England last Spring, and is well informed on automobile topics.

Races at Inter-State Fair, Trenton, N. J.

THE automobile races held in connection with the above-named fair were attended by large crowds of people, and that they were exciting was evidenced by the general enthusiasm which prevailed while they were going on. It is estimated that fully 20,000 witnessed the races which were held on the 24th ult.

There were six events on the program, and one of these was scratched, another being added. As automobile racing goes it is said that the events at this meet was better than the ordinary.

The first event of the afternoon was the five-mile race for gasoline vehicles. There were seven entries originally, but two of the machines that were to have entered were damaged at Guttenburg and others had been disabled on the way to Trenton, so that there were but two to start, A. C. Bostwick and Percy Owen, of New York. Mr. Bostwick won the championship at Guttenburg by beating the record made only the week previous by William K. Vanderbilt, Jr.

For the first few laps Mr. Owen held the lead, but Mr. Bostwick soon left him behind when he began to put on more power. After that Mr. Owen was never in it, and Mr. Bostwick won the race, the time being 11.58.

The second event on the program was a five-mile race for steam vehicles. Three of the four entries started, but one broke down early in the race, while it was in the lead by a good margin. Those who started were S. T. Davis, of New York; W. H. Hall, of New York, and W. J. Stewart, of Newark.

Mr. Stewart led at the start and stayed there for two miles, when his machine broke down. Mr. Davis then took the lead and was never in any danger from Mr. Hall's Locomobile. Mr. Davis won the five miles in 11.24. His machine seemed to be a favorite with the crowd, as it ran without very much noise. Mr. Davis' machine was the fastest four-wheeler on the grounds evidently.

The next race was one that interested the crowd more than anything else on the program. It was a five-mile pursuit race between two three-wheeled automobiles or tricycles. Charles Henshaw rode one of these machines and A. C. Bostwick the other. The Henshaw machine carried a four and a half horse-

power motor, while Mr. Bostwick's machine was of ten horse-power; nevertheless Mr. Henshaw won with the greatest of ease, lapping the bigger machine in two miles, the time of which was 3.48. During this race there was considerable excitement manifested among the spectators.

Following this came a five-mile exhibition by Mr. Henshaw on the tricycle to beat the record of 7.23. The attempt was not a success, owing to the machine being unable to take the corners and hold the high rate of speed necessary.

Mr. Henshaw gave a fine exhibition of daring riding, and even though he failed in his attempt he was given a warm round of applause at the end of his ride.

Below is given a list of events, with names of winners, times, etc.:

Gasoline Vehicles, five miles—Won by A. C. Bostwick, Automobile Club of America; Percy Owen, New York, second. Time, 11 minutes 58⅖ seconds.

Steam Vehicles, five miles—Won by S. T. Davis, Jr., New York; W. H. Hall, Bridgeport, second. Time, 11 minutes 24 seconds.

Tricycles, ten miles, limited pursuit—Won by C. S. Henshaw, Brooklyn; A. C. Bostwick, A. C. A., second; distance, two miles. Time, 3 minutes 48⅕ seconds.

Ten-mile Championship, open to winners of events 2, 3 and 4—Won by S. T. Davis, New York; A. C. Bostwick, New York, second; Percy Owen, New York, third. Time, 20 minutes 20½ seconds.

Reserved Race, ten miles, open only to members of the Automobile Club of America—Won by S. T. Davis, New York; A. C. Bostwick, New York, second; Percy Owen, New York, third. Time, 20 minutes 49 seconds.

Five-mile Exhibition on a tricycle by C. S. Henshaw against record—Record, 7 minutes 32⅕ seconds; Henshaw, 8 minutes 29 seconds.

A Frequent Caller

THE following story is told at the expense of a well-known man who calls frequently upon an equally well-known young woman who has been summering at Arlington, near the Country Club, at Columbus, Ohio:

The gentleman, so the story goes, engaged an electric automobile for the trip one afternoon, and, armed with a new book, a box of candy and a bunch of roses, went speeding out Fifth avenue for a long afternoon visit.

Just as the turn was made on the road leading toward the club the manipulator of the automobile discovered that some trifling disarrangement of the brake would prevent his stopping the machine. It sped along notwithstanding the call of the passenger to stop at the first house on the right.

Finally the motorman was forced to confess that he could not stop until the electric charge in the storage battery had exhausted itself.

That seemed funny enough for the first trip or two around the block, but riding about in a circle under the circumstances got exceedingly monotonous after awhile.

Then the young woman, it is said, became curious and was at a loss to understand why her caller preferred to ride aimlessly around in that fashion. She went to the front door and down the road in answer to the gentleman's signal.

He explained the best he could as the automobile flew past, and after a half dozen more turns she began to understand the situation.

It seems the battery had two hours more to run, and if it all ran out at Arlington there would be no way of getting the machine to town. Then they arranged a sort of railroad station mail catcher plan and the gentleman passed out the book, then the candy, and finally the roses to the young woman as the vehicle whizzed past her.

It took a trip for each article and a few more trips to say goodbye, when they were warned by the operator that he must start for town or risk being stranded somewhere without motive power.

A few farewell waves, and amid the amused shouts and laughter of the Arlington resorters, who had gathered by this time, the disobliging and obstreperous machine disappeared over the hill toward town.—(*Ex.*)

Boston Park Commission Allows Additional Privileges to Automobiles

THE Park Commission of Boston has just granted more privileges, which shows that the agitation of the subject by owners and users of the now popular "auto" has borne fruit.

At a meeting recently held the Board voted to extend the time within which automobiles are allowed in the park one hour on each end of the day. This means that automobiles can have free run of the parks in the morning before half-past eleven and in the evening after half-past eight. In commenting on the change Chairman Stratton said:

"The Commission thought it best to hold to its policy of going slow in admitting automobiles until horses such as are driven in the parks become accustomed to the vehicles and until we have a chance to see just how they will be operated. The principal thing now is to see whether the automobiles observe the road rules adopted for the parks and keep within the speed limit.

The Commissioners are evidently uncertain as to just how much of a tendency there will be for automobilists to spurt their machines in the parks or to abuse the privileges already granted in such a way as to infringe on the rights of ordinary frequenters of the parkways; and the strictness with which operators keep within the present regulations will evidently have a good deal to do with the granting of further privileges later. The present speed limit in the parks is ten miles an hour."

In the October number of *Outing* Mr. Robert Bruce contributes an interesting article entitled "The Place of the Automobile." He points out the peculiar enjoyment of those who ride in an automobile for the first time, drawing comparison between the person who rides behind horses and the automobilist. The article is replete with references to the delights of automobile riding and contains a number of illustrations of well-known automobilists, each seated in his or her conveyance.

Items of Interest

The following statement with regard to the intentions of the American Bicycle Company, so far as the manufacture of automobiles is concerned, was made at the annual meeting of that company held October 9.

In his report, President R. Lindsay Coleman, in conclusion, said:

"The policy adopted by the company in marketing its goods has had a good effect, and we believe that during the coming year the trade will be on a more staple basis than it has for some years. The auditing of the various firms and corporations purchased by the American Bicycle Company has finally been completed, as of the date on which they were taken over by this company; and the claims against the vendors under the contracts for purchase are now being adjusted, and will be pushed to final completion of settlement as rapidly as possible. The manufacturing and sale of automobiles has had much attention by the executive of the company, and, as our facilities are unequalled for the manufacture and sale of such goods, we believe that the company is in a most excellent position to prosecute this branch of the business."

Mr. L. H. Bill, who has been prominently identified with H. A. Lozier & Co. since their inception, has acquired an interest in the E. R. Thomas Motor Co., of Buffalo, N. Y., manufacturers of the "Autocrat" motor bicycles, tricycles and carriages.

The automobile is fast making friends among the royalty of European countries. Among the latest converts to the new form of conveyance are the Prince of Wales, who has tried almost every type of motor vehicle, and the Shah of Persia.

The automobile is being put to many uses, one of the latest being its adoption in conducting political campaigns. The gentleman who is to put the machine to such use is Mr. F. H. Hunter, of Pelham Manor, N. Y. He has just been nominated for member of Assembly and intends to travel around in an automobile when working for his seat.

Items of Interest

It is rumored that the French generals will use automobiles in the next army maneuvers. Some of them, it is said, will carry guns.

The automobile clubs of Philadelphia, two in number, have decided to hold a semi-annual parade in that city, one in the spring, the other in the autumn.

The City of Cincinnati contemplates the use of a motor vehicle by the patrol wagon service of the police department.

The absence of noise and the general unobtrusiveness of a good automobile is recommending it to the leading undertakers of Philadelphia and other cities. Although some profess to be shocked at the use of machinery for such purposes, they cannot but admit that it is preferable to the clatter of horses' hoofs on city streets.

On October 5, while a motor vehicle, in which were Mr. and Mrs. Wood, of New York, was passing through Larchmont the Locomobile was wrecked by one of the wheels catching in the frog of a trolley car track. Mr. and Mrs. Wood were thrown from the machine and were badly bruised and scratched by striking on the macadam road.

The automobile manufacturers began by using too small motors, but they are now increasing their power in many instances. As a straw showing this tendency we note that it is announced that the 1901 "Napier" carriages will have nine horse-power motors instead of eight as at present.

On a recent occasion, when returning from a meeting of the Committee of Contest connected with the Madison Square show, which meeting was held at the office of Mr. A. L. Riker, Elizabethport, N. J., Cornelius J. Field rode in a De Dion motorette from South Ferry to Astor Court, back of the Waldorf-Astoria, in the short time of 17 minutes and 50 seconds. When one takes into account the great number of obstacles usually met while riding along thoroughfares between the points named, this is certainly a piece of good work.

The Automobile Magazine

William K. Vanderbilt, Jr., recently ran his racing auto from Newport to New York through all kinds of weather. He made the run in thirty-six hours.

The Quick Manufacturing Company, formerly of Paterson, N. J., has disposed of its patents and plants to the Remington Company, which manufactures firearms, typewriters and automobiles. The plant will be moved to Ilion, New York. E. M. Rodrock, of the Quick Company, will go to Ilion to superintend the building of gears and motors.

At the well-known auction rooms of Van Tassel and Kearney, East Thirteenth street, this city, where for the past thirty-eight years horses and wagons have been sold, the first automobile that has so far found its way into this famous old mart was sold a few days ago.

When the auctioneer put it up for sale a skeptical man among the crowd asked, "Is it warranted sound, kind and true, like horses?"

The auctioneer replied, "You buy it as it stands; it has been used only three months and cost $900 when new. How much for it?"

There was lively bidding from the start, and in a short time the motor vehicle was knocked down for $550.

Philadelphia Park Commissioners have just thrown open Fairmount Park to automobiles, except for West Side River Drive, used as a speedway for horses, and the Wissahickon Drive. But to meet complaints of reckless driving of automobiles they have decreed that every horseless vehicle using the park after October 15 shall display a number on the back. The numbers are to be supplied free of charge by the Commission.

As showing the strength possessed by some motor vehicles it is interesting to note that while at the recent Boston show one of the electric carriages was being run about the indoor area, showing the ease with which it could be guided among the posts, the operator missed his calculation a bit and crashed into one. The heavy carriage came out of the encounter with only a scar, but the wooden post was split sufficiently to make it necessary to put in a new one the following morning.

Items of Interest

The lost work in operating a good bicycle is less than 5 per cent., but the efficiency of the people who ride bicycles varies from 25 to 90 per cent. Inventors are constantly striving to devise means to increase the efficiency of the bicycle as a machine, but it would be better if more attention was bestowed upon the habits of the rider.

The Automobile Club of America has just issued its first club book, copy of which has been received by this office. The book contains a vast amount of information that should prove valuable to all users of motor vehicles. It may be said that, among other things, it contains names of officers of various automobile clubs in this and other countries, road ordinances, legal opinions on automobiles, road books and maps, etc. It also contains full names and addresses of members. The book contains 135 pages.

In America there is a tendency to blame the driver of an automobile for reckless running when an accident happens where a horse-pulled vehicle gets the worst of a collision. Automobiles are so popular in France, on the other hand, that a horse-pulled machine nearly always gets the blame when it does not keep out of the way of an automobile. A case of this kind came before a French court lately and the driver of a cab was assessed 2,000 francs damages for running into an automobile.

We never knew of an exposition being held where there was not dissatisfaction with the award of prizes, but we think the awards made by the judges of the present exposition at Paris have caused more heartburning than anything ever known before, especially in the transportation department. This is particularly noticeable in the automobile exhibits, where absurdities are more popular than sensible designs.

People who do not patronize artificial means of locomotion are often unfair toward innovations on walking. They demand that bicycles be prohibited from exceeding a walking pace and that automobiles shall not exceed the speed of a slow trotting horse. It is hard convincing some people that the world moves.

The Automobile Magazine

According to a consular report the City Council of Chemnitz, Saxony, has adopted the following rules, which apply to drivers of automobiles:

(1) Persons under fifteen years of age and persons who have no knowledge as to the management of such machines shall not be intrusted with the running of automobiles.

(2) All persons who do not give their undivided attention to the management of automobiles, or who, while using the same, fall asleep or get intoxicated, are liable to punishment.

(3) The signal to turn out shall be "Heeh." The use of signal horns will be permitted until further notice.

(4) Every automobile must carry at least one very good lantern; the same shall be lighted at the same time as the street lights.

(5) The speed of automobiles in the city shall not be faster than that of an ordinary trotting horse.

No one shall run an automobile faster than a horse walks—(*a*) On leaving buildings or sheds bordering on the street; (*b*) during church service in the neighborhood of churches; (*d*) in places where there is large foot traffic; (*e*) in places where fast driving is forbidden.

(6) Automobiles shall not be left unattended on the street. Any one disobeying these rules shall be punished.

Correspondence

THE OTHER SIDE OF THE ALCOHOL QUESTION

I have read with interest the article which appeared in the September issue of your valuable magazine entitled "The Value of Alcohol in Automobile Practice." The writer of the article referred to has evidently but slight knowledge of the question. He is correct in stating that alcohol for use in the arts is untaxed in Germany, but 10 per cent. of impure wood alcohol has to be mixed with it in order to destroy its use as a beverage, and the price at which the mixture, which is called methylated spirit, is sold in Germany and England is about 50 cents per gallon. The present price of wood alcohol is 75 cents per gallon, and it is just as effective as methylated spirit, and is more free from odor, as the refined wood alcohol made in this country is thoroughly refined, while the impure article used to mix with grain alcohol abroad is very rank in odor.

He also states that section 61 of the Wilson Bill, which pro-

vided that "alcohol for use in the arts shall be free of tax under such restrictions as the Secretary of the Treasury shall impose," was not enforced owing to the "laziness" of Mr. Carlisle, who was then Secretary of Treasury. The fact is, that after a careful examination of the subject Mr. Carlisle came to the conclusion that he could not enforce the law and give protection to the enormous revenues which the government derives from the tax on whiskey; as alcohol, whether mixed with petroleum or wood alcohol, may be separated, and the enforcement of the law would have meant hundreds of "moonshine" establishments. A committee of the large users of grain alcohol waited upon Secretary Carlisle, and asked him to enforce the law, and he told them that if they could devise proper regulations he would do so; but after a month of careful investigation they stated that they could not offer him a safe plan for putting the law into operation. It is rendered possible in Germany and England to give free alcohol under the restrictions before mentioned owing to the comparatively small territory of those countries and the enormous number of government officials who have such matters in charge, and even then there are constant infringements of the law. In the United States, with its large territory and comparatively small number of officials, it would be impossible to safeguard the revenues of the government. The matter has been careful investigated by committees of Congress and by the experts of the Internal Revenue office, with the result that it has been deemed impossible to give untaxed alcohol without giving untaxed whiskey.

J. W. Bowman.

Williamsport, Pa.

AUTOMOBILISM IN ONTARIO

The automobile industry in Ontario is yet in its infancy in spite of the fact that there are two first-class gasoline and electric equipments which are inventions of residents of Ontario.

The proverbial conservatism of the Canadian, inherited from his English and Scotch ancestors, is no doubt the cause for this state of affairs. It requires money, and lots of it, to experiment with "the carriage of the future," and your Canadian is rather too conservative to enter into anything so radically new to his training.

Time, money and demonstrations of the practicability of the automobile for both business and pleasure will change these conditions, and I do not know of a better medium through which to reach them than yours.

The Automobile Magazine

At present there are three automobile companies building practical carriages in Toronto and Hamilton.

The Canadian Motors, Ltd., using the still battery and motor. The McLaughlan Gasoline Engine Company, using the "McLaughlan non-vibrating engine," and the National Cycle and Automobile Company, manufacturing locomobiles.

There are no automobile clubs as yet in Ontario, although steps are now being taken for the formation of the first club.

There are several American automobiles in use in Toronto and Hamilton.

Automobile headquarters in Hamilton are at the office of Charles Cadmus, the automobile promoter, No. 14 Sun Life Building, where visitors are always welcome. Mr. Cadmus is now organizing an automobile manufacturing company to make electric "Ideal" and gasoline "Perfection" types of carriages.

More power to you, and if our "Horseless Man" can help, count on my aid at any and all times.

Hamilton, Ont. "DON."

RESTRICTIONS AGAINST THE STEAM AUTOMOBILE

For continuous runs with automobiles or for doing heavy work with that kind of motor carriage, no form of power has been so satisfactory as steam. There are now compact forms of steam engines applied to automobiles which take up very little space and are as easily manipulated as an electric motor, but they are not popular with users because restrictions concerning their use are weighted upon them by municipalities that make their use burdensome and attended with incessant annoyance. In many places a license is required for the operator of a steam driven motor of any kind, and those who by ignorance or design violate the license ordinance are likely to get into serious trouble. In New York City, for instance, no one is permitted to care for a steam engine without having a license. Certain villages in the neighborhood have adopted similar ordinances, with the result that a man from New York with a steam automobile dare not pass into any of these places without incurring the danger of arrest. There are no restrictions on those who handle other forms of motors, although some of them require more knowledge and skill in handling safely than do the steam propelled motors.

The weakest point about most of the boilers used for automobiles is that they are likely to scale up in a short time from the impurities in the feed water. As the boiler cannot be properly cleaned scaling up entails the expense of a new boiler. If boilers

of the Herreshoff type were used they would be much less liable to suffer from the effects of hard feed water than any other. The Hereshoff boiler is made of coiled water tubes and is particularly safe from the dangerous accidents to which steam boilers are usually liable.

New York, N. Y. S. Ancloss.

Notes from Abroad

COMPRESSED FUEL

According to a recent consular report from Frankfort, Germany, a syndicate has been formed for the purpose of acquiring a patent for improvements in machinery for agglomerating fuel, and the right of granting licenses for the manufacture of artificial fuel. It is proposed, in addition to working machines, to sell such machines to colliery proprietors or others, either for a fixed price or on royalty. The particular briquette proposed to be manufactured by the syndicate will be free from pitch or tar, and, while comparatively smokeless, will give an abundant flame, and will be of a convenient size, averaging about 9,000 to the ton. The briquettes are clean to handle and are not easily fractured.

It may be that fuel compressed as the above would prove of great value for steam road carriages, instead of coke as is now generally emloyed for firing the furnace.

NEW FRENCH MOTOR-TRICYCLE RECORDS

It is a long time since any attacks were made upon records in Paris, and it has been left to Rigal to do this. He simply slaughtered the previous best performances. His figures were: One lap (666 metres) in 31⅗ seconds (previous record, 32⅖ seconds); 10 kilometres in 8 minutes 25 seconds; 20 kilometres in 16 minutes 16 seconds (previous record, 16 minutes 47 seconds). The 20 kilometre record has stood to Béconnais' credit since May 20 last, but Rigal's time is no less than 31 seconds faster, and represents a speed of 73 kil. 800 m. per hour.

CUBA WANTS MOTORS

A letter received by a New York export house from a Cuban correspondent says there is a demand there for automobiles suitable for transporting cane on the plantations and to the grinding factories. At present the work is done with bull-carts, and is unsatisfactory. The larger plantations are equipped with railroads connected with the large grinding stations, but the smaller properties generally are less advantageously situated. It is from these that the demand for

automobiles, it is thought, will be large if a suitable type can be constructed. The correspondent wrote that a planter of experience told him such a cart should be an ordinary platform affair, without sides, about seven feet broad, and the capacity about three tons of cane. The wheels should not be high, and the motive power should be steam. Extraordinary speed, of course, would not be a necessity, though ability to get over the ground with fair rapidity would be an advantage.

ACCIDENTS IN FRANCE

According to the *Velo's* return of accidents for July last, the automobile has hardly been so blameless during the month as is its habit, but all the same fewer accidents can be laid to its charge than in the case of the three other principal means of locomotion. The motor-vehicle is held responsible for twenty-eight accidents, in three incidents these being fatal ones. In one case the victim was a pedestrian, but in the other two the *chauffeur* himself met his death. In the first instance an old lady, half blind and deaf, was knocked down by a car passing through Magny-en-Verin (Seine *et* Oise), and succumbed the following day to a fractured skull. At Longwy a motor-cyclist fell from his machine and died almost immediately, while upon the same day, at Ville d'Avray, M. Jasques Ellisen was thrown from his car and killed on the spot. This is the motor-car's black list, and the record which most nearly approaches it for moderation is that of the railway. Here we find fifty-four accidents, bringing eleven deaths in their train. The bicycle has caused one hundred and seventeen mishaps, and claims ten fatalities, while the horse's record runs up to no less than six hundred and thirty accidents and sixty-eight deaths. The grand total, therefore, amount up to eight hundred and ninety-seven, resulting in ninety-two deaths.

In this connection it may be interesting to refer to a somewhat curious accident which occurred recently. The mishap occurred on the 18th ult., between Lyons and Aix-les-Bains, at what is perhaps the most dangerous place of the route, known as Pont de l'Abime. Here the road skirts the River Sierroz, and a sheer drop of some thirty-five feet to the surface of the water makes the spot by no means a pleasant one. On the 18th ult., M. Chappuis, of Lyons, accompanied by Dr. Lochon and a servant, were driving slowly, *en route* for Aix-les-Bains, when at this spot a sudden side-slip on the greasy road precipitated the vehicle and its occupants into the river. Dr. Lochon suffered a broken leg, but the other two travelers escaped unscathed from what one would have considered to be certain death. Even the car showed but comparatively little sign of its terrible fall.

Automobile Club Directory

Under this heading we shall keep a record of the motor vehicle clubs both of this and other countries, and we hope to have the co-operation of club officers in keeping it accurate and complete.

Automobile Club of America, Homer W. Hedge, Secretary, 120 Broadway, New York; S. M. Butler, Assistant Secretary, 95 Liberty Street New York; representative on International Racing Board, Clarence Grey Dinsmore; Substitute, John H. Flagler.

Automobile Club of Baltimore, W. W. Donaldson, Secretary, 872 Park Avenue, Baltimore.

Automobile Club of Chicago, Andrew R. Sheriff, Secretary, Calumet Club, Michigan Avenue, Chicago.

Automobile Club of Columbus, O., C. M. Chittenden, Secretary, Broad Street.

Cleveland Automobile Club, L. H. Rogers, Secretary, Cleveland, O.

North Jersey Automobile Club, E. T. Bell, Jr., Secretary, Paterson, N. J.

Automobile Club of Rochester, Frederick Sager, Secretary, 66 East Avenue, Rochester, N. Y.

Philadelphia Automobile Club, Frank C. Lewin, Secretary, Hotel Flanders, Philadelphia, Pa.

San Francisco Automobile Club, B. L. Ryder, Secretary, San Francisco, Cal.

Columbia College Automobile Club, Lewis Iselin, Secretary, Columbia College, New York, N. Y.

Buffalo Automobile Club, George S. Metcalf, Secretary, Buffalo, N. Y.

Western Automobile Association, Chicago, Charles T. Jeffery, Secretary, Monadnock Building.

AUSTRIA.

Budapest—Magyar Automobil Club, 31 Musem Korül.

Innesbruck—Tiroles Automobil Club, Rudolph-Strasse 3.

Prague—Prager Automobil Club.

BELGIUM.

Antwerp—Automobile Club Anversoir, 34 r. Longue de l'Hopital; President, Baron de Bieberstein.

Brussels—Autcmobile Club de Belgique, 14 Pl. Royale; Moto-Club de Belgique, 152 Boul. du Nord; Touring Club de Belgique, 11 r. des Vauniers.

Charleroi—Automobile Club de Charleroi, Hotel de Esperance.

Ghent—Automobile Club de Flandres.

Liege—Automobile Club, Liegeois, 2 r. Hamal.

FRANCE.

Amiens—Automobile Club de Picardie, 36 r. de La Hotoie.

Avignon—Automobile Club de Avignon.

Bordeaux—L'Automobile Bordelais.

Dijon—Automobile Club, Bourguignors Cafe Americanie.

Lyon—Bicycle et Automobile Club de Lyon; Motor Club de Lyon, 3 pl. de la Bouise.

Marseilles—Automobile Club de Marseilles, 61 r. St. Fereol.

Nance—Automobile Club, Lorrain, Thiers pl.

Nice—Automobile Velo, Club de Nice, 16 r. Chauvain.

Paris—Automobile Club of France, 6 pl. de la Concorde; Motr-Club de France; Touring Club de France, 5 r. Coq-Héron.

GREAT BRITAIN.

Birmingham—Motor and Cycle Trades Club, Corporation street.

Edinburgh—Scottish Automobile Club.

Liverpool—Liverpool Self-propelled Traffic Association, Colquitt street. Secretary, E. Shrapnell Smith.

London—Automobile Club of Great Britain and Ireland, 4 Whitehall Court, S. W. Hon. Secretary, C. Harrington Moore.

HOLLAND.

Nimegue—Nederlandsche Automobile Club.

SWITZERLAND.

Geneva—Automobile Club de Suisse, 9 boul. de Theatre.

The Automobile
MAGAZINE

A Live Journal for all interested in Motor Vehicles

VOL. II NO. 7 NEW YORK OCTOBER 1900 PRICE 25 CENTS

Published Monthly by
THE AUTOMOBILE PUBLISHING CO.,
95 LIBERTY STREET, NEW YORK.
Telephone: 984 Cortlandt. Cable Address: "Loceng," N. Y.
ANGUS SINCLAIR, President. JAS. R. PATERSON, Secretary.
FRED H. COLVIN, Vice-President and Editor. JAS. J. SALMOND, Associate Editor.

BOSTON OFFICE, 170 Summer Street.

Subscription Price, $3.00 a year in the United States, Canada and Mexico. Foreign Countries in the Postal Union, $4.00 (gold). Advertising Rates on application.

Copyrighted, 1900.

Entered at New York Post Office as second-class matter.

For Sale by Newsdealers everywhere.

Announcement

HAVING purchased THE AUTOMOBILE MAGAZINE and everything pertaining thereto, it is our intention to make it the leading journal in the field, giving especial attention to the users and prospective purchasers of motor vehicles.

With this in view we shall be pleased to receive communications relating to the practical operation of the various types of motors and to hear of any difficulties which are encountered.

We owe an apology to our readers for the haste in which it was necessary to get the present issue together—but which could not be avoided under the circumstances.

We intend, however, to make a number of important changes in the near future which will place it in the front rank, and ask a little indulgence until the new machinery can be put in motion for its accomplishment.

The Philadelphia Parade

Owners and users, builders, the mechanicians who look after the machines, the repair and supply men, are all interested in having all the available information in a convenient form, and can all assist in making THE AUTOMOBILE MAGAZINE a mine of useful information for all concerned. We feel sure we can count on your aid and hope to hear early and often.

Descriptions of tours or pleasure trips, illustrated by photographs, if possible, do much toward making converts to the vehicle which relieves us of the anxiety of over-driven horses and blind staggers. Tell us about some of your recent trips and how the motors behaved.

We also want to hear from all the Automobile Clubs, to have a list of their officers and members, and to know of their intended runs and social events. We intend making the magazine an encyclopedia of automobile information, without any of the "dry as dust" features of the aforementioned venerable volume. Please keep us posted on these matters, it will be mutually beneficial.

The new company is formed of members of the Angus Sinclair Company, who have had years of experience in successful publication work, and who propose to utilize this in making THE AUTOMOBILE MAGAZINE a first-class journal in every respect.

Believing that the readers and friends of the magazine will give us their hearty co-operation, we take up the work with every assurance of success.

THE AUTOMOBILE PUBLISHING CO.,
No. 95 Liberty Street,
New York.

The Philadelphia Parade

WHEN the leading newspapers continue to devote as much space to a subject as is accorded the automobile, it is pretty good evidence that the motor-vehicle is becoming more and more an important factor in the life of many people. In this connection the following editorial from the Philadelphia *Inquirer* regarding the recent parade in that city may be of interest:

"The gathering of automobilists in parade on Saturday showed this city a few things that are worth considering. In the first place it showed that automobiles have come to stay, and, perhaps, in the near future, to usurp the functions of the horse. It is only a year since the vehicle was taken up seriously by Phila-

delphians, and yet in that year the number and quality of the automobiles have increased in a remarkable manner. In the parade Saturday eighty-nine of these pleasure machines participated, and by this time next year it is safe to predict that the number will be increased by hundreds.

"In the second place it showed that a broad-gauge policy in regard to the city and her public places is the best policy, after all. When automobiles first became popular they were barred from Fairmount Park, and it has been only by the hardest and the most persistent work that the Commissioners have been persuaded to open the driveways and the roads of that pleasure place to the machines. It was to celebrate this reversal of the decision of the Commissioners that the parade was held. For this the Philadelphia *Inquirer* can frankly accept the thanks of the automobilist. It was through the work of this paper that the broad-gauge policy was inaugurated.

"A third fact was the remarkable interest displayed by the public in the parade. Crowds of pedestrians turned out to see it go by, and the streets were lined on both sides with vehicles drawn by horses, the drivers of which displayed as much interest in the event as the automobilists themselves. In recent days one of the great functions of society has been the coaching parade, but no crowds ever turned out to see those events that compared in number and in brilliancy with the one that watched the horseless vehicles in stately procession."

The Races and Exhibits of the Month

THE three race meetings of the month of September were all interesting events, and aside from the demonstrations of speed they have created increased interest in the machines and in their possibilities.

While racing will not be indulged in by the majority of users of motor vehicles, there is always an attraction about trials of speed or strength that command attention from all of us and make us think more about the machines than we would otherwise.

In this respect the races and exhibitions are excellent advertisements, as they show the different types of machines to those who may have considered automobiles as a possibility but not as an accomplished fact.

The Races and Exhibits of the Month

Those who drive horses are beginning to be interested in the machines which can cover so much ground in a day's traveling without going lame or getting winded, while there are many who have thought of horses, or both, but who have not decided which to get. Both of these prospective buyers are influenced by good exhibitions and the expense of such shows is sure to be realized at no very distant day. We believe they all help to make motor vehicles popular and should be encouraged.

The Motor Vehicle in Warfare

ONE or two of the European countries have been and are still devoting considerable attention to the subject of using self-propelled vehicles in the transportation of war material and in actual warfare generally.

The South African war just about ended has demonstrated the fact that, especially in time of war, the death rate among horses and their disablement are vexing problems. The weight of some pieces which have to be drawn from one scene of operation to another are immense, and it is little wonder so many horses "fall by the way," especially in wild, hilly territory, and where the scenes of action are apt to change quite frequently. The problem of moving a large army with the necessary ammunition and stores is a difficult one to solve, and as endeavoring to arrive at a satisfactory solution it may be of interest to refer to the trials recently carried on by France and Germany.

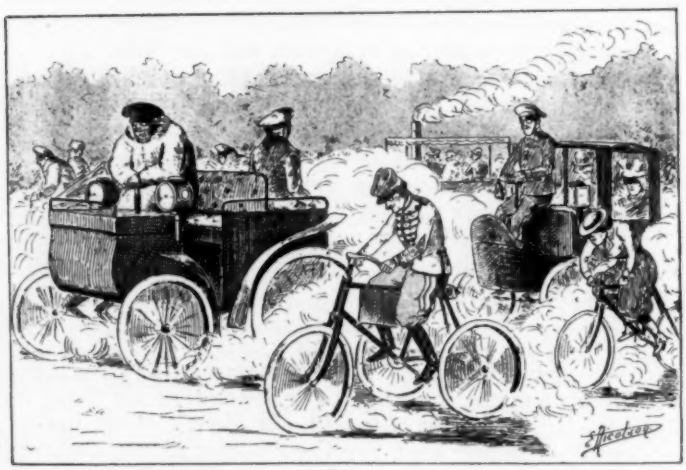
In the tests referred to eight large wagons were employed for transporting material, guns, ammunition and stores—two Panhard *et* Levassor wagons, two De Dietrich lurries, two De Dion wagons and two Scotte trams. Each General had a patrol car at his disposal, together with a number of voiturettes and motor cycles. A commission was appointed to report upon the behavior of the vehicles referred to, as well as the cost of their operation, and its report will be looked for with considerable interest, especially by military men.

It is the general tendency both to underrate the horses' capacity for work and the increased power necessary for more rapid traveling. This was the case with the electric street car when they began by putting on a five horse-power motor, and on the same size car they now use one of at least twenty horse-power.

Automobile Humors

IN THE BOIS

Before



Now

—*Journal Amusant*

Automobiles for Stage Service

IT does seem as though the automobile could be used to decided advantage in the transport of passengers from small towns to the stations of the great railroad systems which enter the great cities.

There are a great many places where this is done by means of stages drawn by horses and sometimes over very hilly roads. Such traffic is very hard upon the horses, and after a few years continuous service as stage horses they are not of much further use.

If, in place of horses being employed, small self-propelled buses, say with a seating capacity of from 8 to 10 passengers, were used, it would be considerably more agreeable and would in the long run pay. Of course, the first cost would be greater than for horses, but ultimately those interested would find that this would more than be compensated for by the saving in losses from cost of feed, etc.

Not only that, but the patronage now accorded such stages would be more general. Perhaps it would be a good thing for the railroads to look into this, and see if anything can be done along the lines suggested. The traffic from such small towns is certainly great enough to justify the best that can be given in the way of transportation, and in cases where the trolley is not available it would seem the automobile might be used.

To the devotee of the camera the automobile presents great possibilities for the pursuit of his objects—the natural beauties that abound in almost every section of the country. The wheel limits one to the most compact of cameras, and a tripod becomes a veritable nuisance unless it is so full of joints that it will fold up very short. The automobile, however, allows you to carry as large a camera as you wish and any tripod that suits, while it enables you to go anywhere within reason without being exhausted by physical exertion. As a promoter of photographic work the automobile will be a grand success and the makers of such apparatus are sure to take advantage of it.

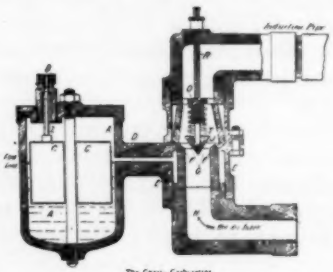
An Automatic Carburizer

THE *Autocar* shows an ingenious device invented by M. Charly, and is being used by Messrs. Burford and Van Toll, of the New Orleans Motor Works, Twickenham.

This simple appliance is said to act so well that they are able to do away with the mixture lever generally fitted to the steering standard. Only the throttle and sparking levers are retained.

The cut shows the construction to be of the float feed type with gravity feed. The operation is as follows:

The spindle *R* is set to permit of the passage of a certain proportion of air to petrol when the engine is running, say, at



The Charly Carburetter.

eight hundred revolutions, the truncated cone being raised against the spring by the induction to allow this at every intake. Should the engine begin to race above the normal speed, the force of the induction is proportionately increased, the cone *J* is raised higher up the rod *R*, admitting a larger proportion of air, thus weakening the mixture and slowing the engine. On the other hand, should the engine slow below the normal, the cone *J* is raised less, and the opening for air passage in *G* being more constricted, the mixture is proportionately enriched, and the explosion therefore more powerful. In all the carbureters made the cone *J* and the coned point of the rod *R* are turned much larger than is shown in the illustration, the apex of the cone penetrating much farther into the space *G*.

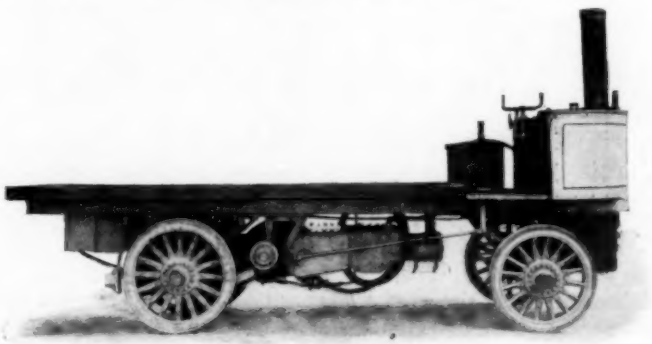
It has also been adopted by Mr. George Richards, who builds voiturettes under the Vivinus patents.

An English Steam Wagon

THOSE of our readers who are familiar with the English "lurry" used for trucking purposes as distinguished from those used here will readily recognize the wagon shown in the accompanying illustration as an English product.

It is probable that England, more than any other country, has gone further in the line of development of automobiles in their application to carrying of heavy loads.

The wagon shown, which was built by the Lancashire Steam Motor Co., of Leyland, England, possesses a number of interesting features. It is capable of carrying a maximum load of four tons, and is made sufficiently heavy to withstand severe shocks.



New English Steam Truck

The axles are of girder section, while the wheels are made upon the gun carriage principle, the hubs being of steel and fitted with bronze bushings.

It is possible with this machine to use such type of body as is most suitable to the work in hand. The one shown is made of oak framing with teak bottom, and, as will be seen, simply rests on the steel framework, being entirely free from the machinery.

The boiler, which is placed in front, is designed to burn coke as fuel, most of the former machines turned out by the company having been made to use liquid fuel for firing the boilers. It has 89 square feet of heating surface, with a working pressure of 200 pounds per square inch. There is a small feed pump placed below the engine frame used to supply water to the boiler. This

water, before entering the boiler, is passed through a feed-water heater which raises its temperature from 50° to 180° F. Under the driver's seat is another pump of the Worthington type, which is used to feed the boiler when the machine is standing. All the working parts run in a dust-proof oil bath.

The driving gear is arranged to give two rates of speed with the engine running at the same speed, one of five miles per hour and the other of three miles.

The placing of the driving mechanism under the platform leaves the maximum amount of space for merchandise, and for a wagon capable of carrying a load such as it is designed for, its lines are anything but awkward looking, but rather graceful.

It is claimed that wagons of this type carrying a full load can cover a distance of fifty miles in a day of twelve hours.

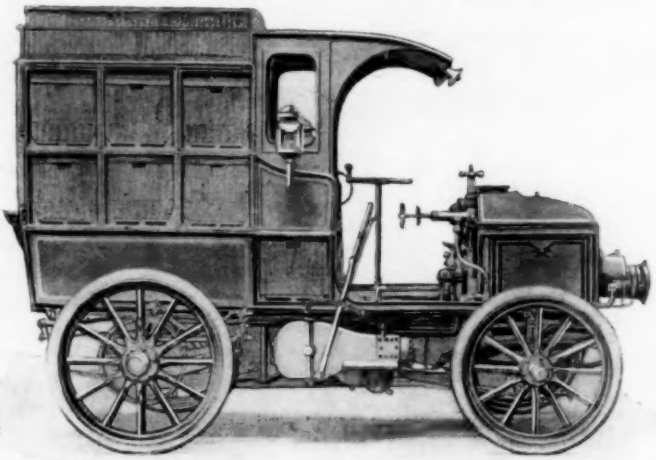
The Chaboche Steam Wagon

RECENT trials in Paris demonstrated the practical features of the steam wagon of M. E. Chaboche of that city, who has been experimenting with that type of motor for some time.

The feature of the car lies, of course, in the boiler, which is of the instantaneous type. It is composed of two concentric shells constituting the steam area, and the inside shell incloses coils of steel tubes of circular section. Care has been taken to construct the boiler with as few joints as possible, and the maker guarantees that they will resist a pressure of 735 pounds.

The boiler is fed from a reservoir with a capacity of 5.3 gallons. This reservoir, or "feeding bottle," as it is called by the maker, is half full of water, and the rest contains compressed air at the pressure at which the generator is required to work. The pressure in the bottle can be varied between 200 and 400 pounds per square inch by means of a regulator placed under the seat of the driver. Thus, at ordinary pressures, the boiler can be fed from the reservoir without the intervention of the plunger pump, but this is used when it is necessary to get higher pressures in the generator. One of the advantages of this system is that when the car is at a standstill there need be no pressure in the boiler, and it can be started without pumping water into the boiler by means of the hand lever, because the pressure in the bottle will allow of an equal pressure being attained in the generator. The

car may be left to itself for several hours by taking care to replenish the fuel from time to time, and it can then be got ready for starting again in five minutes. The fuel used is coal, which is prepared in paper bags containing about twelve pounds, and is dropped in at the top the same as in the De Dion boiler. The employment of bituminous coal would seem to suggest the possibility of a large escape of smoke, but from what we have seen of the running of the vehicle this is scarcely noticeable. The steam



The Chaboche Steam Wagon

exhaust is carried away by a pipe underneath. When the car is starting, or the boiler is working at a high pressure in order to overcome any special resistance, there is a small volume of exhaust, but, under ordinary conditions, there is little or no exhaust observable. From the description of the boiler given above, the question naturally arises whether there is not a danger of the tubes burning, but it will be seen that the tubes play only a small part in the economy of the generator.

A Winton Delivery Wagon

WE present herewith illustration of one of the latest styles of delivery wagon turned out from the factory of the Winton Motor Carriage Company, Cleveland. This wagon is fitted with the regular standard "Winton" motor, which is, together with all working parts, concealed in the body of carriage, amply protected from all dust and dirt.

It is of the single cylinder type, operated with hydro-carbon gas generated from gasoline vapor and air, which elements are

Winton Delivery Wagon

admitted automatically and mixed in a carbureter. Satisfactory combustion is insured by this arrangement, resulting in absence of a great deal of the odor from the exhaust.

By a simple arrangement the motor is under perfect control. A small button placed beneath the right foot, by the pressure applied, varies the speed of motor from 100 to 800 revolutions per minute.

The style of wagon shown is light and is becoming very popular with store proprietors.

The vehicle will run about fifteen miles per hour with a load of from six to eight hundred pounds over fair roads.

Resistance of Road Vehicles to Traction

AT a meeting of the British Association, held September 7, Prof. Hele-Shaw, of Liverpool University, presented a paper on the " Resistance of Road Vehicles to Traction." It is not practicable to produce the paper in full, but below is given a summary. He pointed out that gradual increase in speed of motor vehicles along the common roads, which gradually led to the necessity of having a fairly complete knowledge of the resistance of common roads of various kinds upon different classes of vehicles.

Reference was made to the effect pneumatic tires had, not only upon the life of the vehicle, but upon its resistance also, this being so much the case that efforts have frequently been made to introduce the use of India rubber tires upon traction engines.

The speed indicator used in carrying out the experiments was a Schaffer and Budenburg tachometer, to which a temporary wooden wheel was attached, and a special dial was made, so that instead of indicating revolutions per minute the miles per hour at which the vehicle was traveling were at once made visible. A rope about 20 feet long was attached to the voiturette and connected with the dynamometer, the dial of which an observer was able to read. At the same time a second observer called out the actual speed of the vehicle at that instant and the nature of the road which was being passed over, which were recorded by the first observer in his note-book, together with the pull on the dynamometer.

The net result of the experiments showed that even on apparently the smoothest road, the variation in the pull was so considerable that nothing but appliances which would record autographically both the pull and velocity at the same instant and indicate also the distance traveled, so as to identify the exact piece of road corresponding to the record, would be of any value. Moreover, it was evident that some autographic record of the nature of the road, as well as some instrument for recording the vibration of the vehicle which was being towed, were necessary in order to form some estimate of the effect of vibration upon the resistance. With such appliances the pull on wagons, lurries, ordinary vehicles with iron rims, pneumatic and India rubber tires, could be investigated for any speed, and it is not too much to hope that some definite idea of the laws concerning traction might be found, with the effect of springs, tires and the surface of the road taken into account.

Ideas of Inventors

(Copies of patents mentioned herein can be obtained from the Patent Office in Washington for 5 cents each.)

Among the recent patents we find a spring motor vehicle, in which, as indicated by the name, the motive power is the stored energy of a spring. It is rather surprising that this should be even attempted, as it is safe to say this is one of the most unsatisfactory methods of driving that can be imagined. If the spring is wound by an engine or motor at home it has all the drawbacks of an electric vehicle and none of its advantages. If it is intended to be wound by hand, the whole thing is an absurdity, for it would be easier to propel the car direct, as with a railroad handcar, than to wind a spring which is to unwind and give out its stored energy. (Patent No. 659189, October 2, 1900.)

Steam motor designers are busy, and one of the latest patents is a compound engine with cylinders at an angle of ninety degrees, both driving one shaft. The design appears to be complicated, but may have advantages not apparent from the patent drawings. (Patent No. 659162, October 2, 1900.)

Mr. Charles A. Lindstrom, of the Hewitt-Lindstrom Motor Company, has patented a supporting frame for motors of electric vehicles which seems to have several good points. The proper suspension of motors of all kinds is a problem that needs more attention than it often receives. On this, to a great extent, depends the easy riding of the carriage and the life of the motor. (Patent No. 659080, October 2, 1900.)

A plan for giving the passenger of a motor cab or other similar vehicle the power of stopping the vehicle regardless of the operator is shown in another patent. While there might be instances where this would be of advantage, it does not seem generally desirable. The passenger only sees ahead, and might be seized with a desire to stop at a moment when the operator was keeping out of the way of something behind. It is not a good plan to have the control of a vehicle divided between two people any more than it would be desirable to drive a horse with one person holding each rein. (Patent No. 659121, October 2, 1900.)

The Final Automobile

Hugh Dolnar

I. Permanent Bearings.

THE automobile of to-day is a thing of shreds and patches, a mere aggregation of a vast number of not wholly satisfactory solutions of the multitude of exacting problems of mechanical construction which must be perfectly answered before the automobile stands forth as a perfected whole, and banishes the beautiful but filthy and feeble-witted horse from his present position of tyranizing mastery over the human race. Humanity is so weak physically and so burdened with heavy loads to

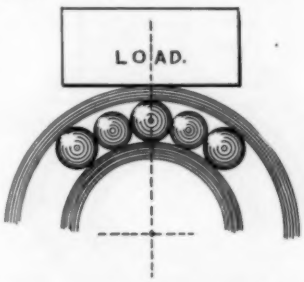


Fig. 1. One Large Ball in Load-line and doing all the Work

carry, that it has been forced to accept the horse, to endure the vile odors arising from this noble brute, the daily homicides caused by his senseless panics of fear, and the never ending toil of cleaning streets which never can be clean so long as the horse defiles them in a thousand places every instant of the day, and repairing the rough pavements which cannot be made smooth and durable, because if the pavements were made smooth the horse would have no foothold, and because no rough pavements have been found which can efficiently resist the millions of heavy blows from iron-shod hoofs which fall in thunderous succession continuously on every city street. All of this mankind endures from the horse, best friend of the farmer—worst enemy and most oppressive tyrant of city life.

To-day we have rediscovered the great truth so fully demonstrated seventy years ago by Dr. Gurney, by Hancock and by

Dance, that loads can be carried on common roads more rapidly and at less cost by mechanically driven wagons than by horse traction, and we see a possible ending of the reign of the horse. We see the possibility of clean and silent city streets, we see an end to the daily loss of human life caused by horses crazed with fear, whose first instinct is to run from all unfamiliar objects, and we accept with joyous welcome every automobile, no matter how clumsy its construction or how serious its defects in performance may be, because it is at least a harbinger of ideal city living, and city life is the natural and most acceptable form of human existence.

These six papers, dealing with the primal mechanical requirements of the mechanically driven road wagon, will assume without discussion the unfitness of the storage battery as a reservoir of power for road wagon driving in general, and will regard it as

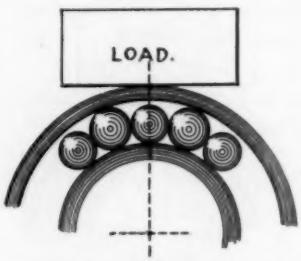


Fig. 2. One Large Ball each side of Small Ball in Load-line

fully proven that the final type of road wagon will be driven by internal combustion heat motors working on the Otto cycle. Steam engine driven road wagons are now the easiest to manage of any automobiles offered, but they are wasteful of fuel, must carry great loads of water, which must be constantly renewed, and demand such a bulk of machinery and tankage that they are certain to be discarded in the near future, because the fired cylinder motor needs no water supply renewals, burns the less fuel and is the lighter, simpler, cheaper and, if perfected, will be the more easily managed. These inherent advantages of the gas engine will certainly lead to its perfection and development into the motor finally accepted as more suitable than anything else for road wagon driving, unless some wholly new prime mover is discovered.

The first requisite of any machine is the permanent retention of all its parts, whether relatively moving or stationary, in very

closely fixed locations with respect to each other. Hence the framing of the final road wagon motor will be rigid, and the bearings which support the moving parts will be so constructed as to work for long periods of time, several months at least, and perhaps for as much as a year, or even more, without detrimental change of form or dimensions, without lubrication, and without attention from the wagon driver. The mere fact that no such bearing is now known, and that the wisest of engineers deny the possibility of constructing such a bearing, is of no importance or significance whatever. The final automobile will have permanent bearings, because it needs them, and because mechanical traction on common roads is cheaper than animal traction, and is the most important mechanical problem now before the world, and

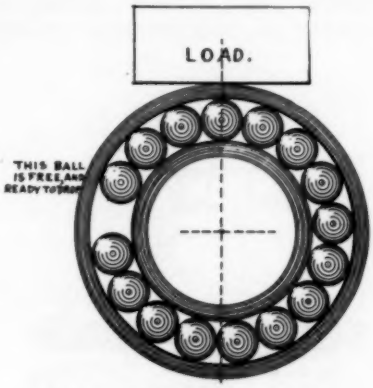


Fig. 3. Slack Filled Ball Circle

is engaging the closest attention of thousands of inventive minds, and therefore the permanent bearing is certain to appear.

No material, except possibly the diamond, is known which will endure sliding friction under even such light loads as are imposed by the moving parts of road wagons, for a year without change of form. It is possible that some of the cheaper and more common forms of crystalized carbon like the black diamond might be so applied as to form sliding bearings which would be permanent for a twelve month at a time without attention, but it seems probable that such carbon bearings would be costly, and it appears now that instead of searching for a material indestructible under sliding friction, the shorter road to the permanent bearing will be found in those interposed elements, located between the moving and supporting parts of a machine bearing,

which convert sliding into rolling friction. Bicycle ball-bearings have very clearly shown that permanent bearings may be had within certain load limits. This is not to say that any bicycle ball-bearings now known are permanent for a year of constant work under maximum load. Bicycle bearings have so far been made with screw adjustments, and it is, as yet, and probably always will be, an extremely difficult matter to make really good screws of any kind or sort whatever.

In general terms it may be said that no ball-bearing depending on screw adjustments can be so accurately made as to be called permanent. Roller bearings, now so much used in automobile work, are of necessity imperfect, since it is impossible to so support the rollers that they are in perfect alignment with the shaft and journal surfaces. This charge of imperfection is clearly proved by the fact that all roller bearings require oil lubrication,

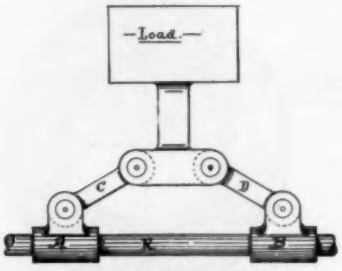


Fig. 4. Toggle Joint. End Thrust Position

which would not be needed if the rollers were round, of nearly equal diameter, straight, and associated with truly cylindrical shafts and journal boxes. The ball-bearing has inherent advantages of construction which seem to make it more likely to give the permanent bearing demanded by the automobile than anything else, and it is here assumed, without discussion, that the final automobile will have all of its constantly moving members supported in ball-bearings.

First, as to the balls. All ball grinding machines are subject to such conditions of construction that they produce three forms of solids, the spheres which they are intended to produce, ovoids, and that three-cornered solid which is not a sphere although having everywhere constant diameters. The only way to obtain real balls of pretty nearly the same diameter to fill a ball-bearing, is to take at least six micrometer readings of six different hand

applied diameter gaugings. A fairly satisfactory bearing can be had with balls varying a quarter of a thousandth of an inch in diameter, but for really good bearings the ball diameter in any one ball circle should not vary more than one ten-thousandth of an inch. One American bicycle maker gauges the balls for every bearing to within the eighth of a thousandth of an inch, using stationary micrometer gauges manipulated by girls, these girls requiring careful selection, and working very short daily hours, as the work is extremely trying.

Assuming round balls, nearly of one size, as the best bearing lubricant for the automobile, the ball supporting ways remain to be considered. The limits of this paper do not permit so full a presentment of bearing ball support forms as might be profitable, but it is enough, perhaps, to assert and clearly show that the two-point ball-bearing most commonly used in bicycle work has

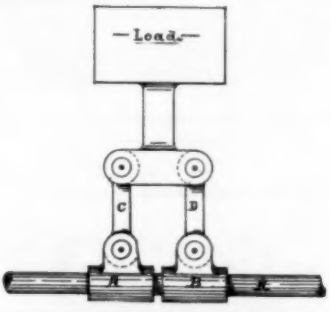


Fig. 5. Same Leverage. Direct Load Support

grave inherent faults, and that the four-point ball-bearing is more promising of success than any other.

Before exhibiting the faults of the two-point bearing, some space should be given to a brief consideration of the action of the balls of a ball-bearing in work, on each other.

Large as is the present use of ball-bearings in the bicycle and the automobile, very few persons have a correct and clear conception of the movements and functions of a circle of balls moving under a load and supported and confined by cones and cups of ordinary forms, and there has been and still is a vast amount of talking and writing and printing based upon wholly incorrect assumptions of the action of the balls, and hence wholly erroneous in the conclusions deduced.

These wrongful conceptions of the action of balls in ball-bearings have not stopped at mere current print, but have often been

carried into the Patent Office, and in many instances these patents, conceived in entire error, have been made the basis of factory operations, sometimes, as in the case of the "Comet" bearings, with great resultant losses, and sometimes with the merely negative results of entailing a lot of work which served no useful purpose, but yet did no particular harm, and so continued to be produced.

The two more prevalent delusions in regard to the action of balls in ball-bearings are, first, that a considerable number of the balls in a ball-bearing in work are under load at the same instant of time, and, second, that a spinning or gyratory movement of the balls, leading to a highly objectionable grinding action between the ball surface and the supporting members is set up by certain forms of ball cone and ball cup, thus causing a very objectionable increase in friction and consequent wear.

Both of these beliefs are wholly erroneous.

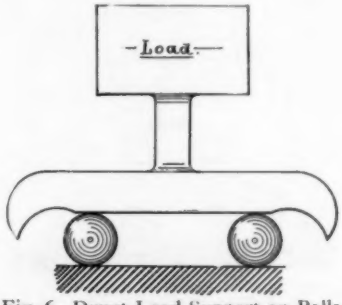


Fig. 6. Direct Load Support on Balls.

The belief that a considerable number of the balls in a bearing are under load simultaneously leads at once to the conclusion that these loaded balls crowd against each other, with the result, since their meeting surfaces run in opposite directions, of causing a great surface friction between the balls themselves, wholly independent of the ball contact with the cone and cup surfaces, and hence silly patents on parts interposed between the balls to obviate this inter-ball friction have been issued in shoals, these needless parts being manufactured in quantities, and loudly heralded as the long sought remedy for the hard rubbing of ball-bearing balls against each other as they travel in the bearings under work. Some of the exhibitors at cycle shows have presented models of ball-bearings in partly transparent enclosures, so that the movements of the balls at work could be plainly seen. In such exhibits the cone and cup circles are always made of the correct diameter,

so that the balls seem to touch each other as they travel, and it is really a difficult matter for the observer of such an exhibit to avoid the conclusion that, say, perhaps one-third of all the balls in the bearing are actually carrying load at the same time, because they appear to the eye to all touch each other, and to all have perfect contact with the cone and cup.

In point of fact, however, there are precisely two cases in ball load-bearing action; no more and no less. These two cases are,

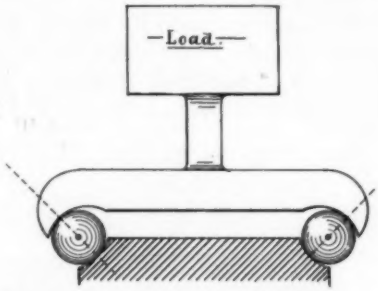


Fig. 7 Angular Load Support, Increasing Ball Crushing Stress

first, where a small diameter ball is located between two larger balls, and, second, where two balls of the same diameter touch each other or are separated by others of smaller diameter. These two cases are shown in Figs. 1 and 2, Fig. 1 showing a large ball

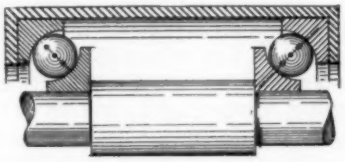


Fig. 8. Two-point Ball-bearing; Angle of Support, 45 Degrees

in work between two small balls, the small balls of necessity carrying no load, because they do not touch the ball cup surface, the entire load borne by the bearing being thus, for the instant, carried by the single large ball as it passes the line of load pressure. In Fig. 1 one single ball is doing all the actual load bearing, all the other balls in the bearing acting simply as guides, leaders and steadiments to keep the bearing parts in their correct relative positions, and so under some small incidental load, of course, but

this incidental load is so very small as to be of no importance whatever. Very clearly, then, in Fig. 1, there is only one single ball supporting the load, and doing all the work done by the bearing in the way of actual load carrying. All of the other balls in the bearing are comparatively free, and unless the bearing is constructed with a degree of accuracy never reached in commercial work, all the balls except the one load bearing ball are actually free to drop by their own weight, and do so drop, as will be conclusively shown later.

In the second case, as shown by Fig. 2, where two balls of larger diameter are separated by a single ball of smaller diameter, it is quite clear that at the instant of passing under the load the two larger balls are in work, and at one point of travel are equally loaded.

These two cases of the location of balls of different diameters in a bearing are all the cases possible. There must be either a large ball between two small balls, in which case one ball only

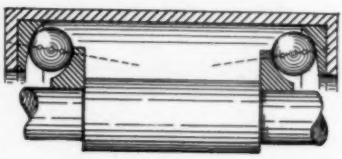


Fig. 9. An Extreme Case; Angle of Support, about 15 Degrees

carries the load, or there must be a small ball between two large balls, in which case the two large balls may be, for an instant, equally loaded. There is, it is true, a third possible case, in which two balls of precisely the same diameter are adjacent, but in this case the load carrying action is the same as if these two balls of equal diameter were separated by a smaller ball, and for an instant both of these adjacent balls of equal diameter bear equal parts of the load. The theoretically possible fourth case, in which all of the balls are of exactly the same diameter, and are supported in cups and on cones which precisely fit these balls, and are also absolutely rigid and so suffer no deformation in work, cannot possibly be produced and never occurs in practice and needs no consideration here.

Because of all this there are always in any ball-bearing either one ball or two balls in work, one or the other, no more and no less, and all of the other balls are, for the instant, mere guides or else actual idlers, and hence even in ball-bearings of very ordinary construction there is no considerable friction caused by the rub-

bing of the balls against each other at the points where they touch, and there is no useful effect to be gained by the introduction of any fourth element, beyond the cones, the balls and ball cups, in a ball-bearing.

These conclusions and assertions will be pronounced erroneous by a large majority of ball-bearing constructors, but for all that they are correct.

A complete support of these conclusions can be had in any cycle factory at no expense whatever, and is also perfectly familiar to all cycle makers, many of whom, however, have totally failed to grasp the very simple and obvious lessons taught by the mechanism shown in Fig. 3, which represents a ball-bearing filled with less than a full circle of balls. All cycle makers are perfectly aware that a slack-filled ball circle will make as many small audible clicks during a revolution as there are balls in the bearing. There is only one possible way in which this little click can be produced, and that is by each ball dropping with a perfectly clear

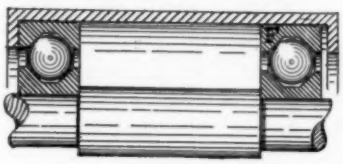


Fig. 10. Four-point Bearing

and unobstructed fall from a higher position, in which the weight of the ball is supported against dropping by cone and cup friction, to a lower position fixed by the striking of the falling ball against the next ball below it. All cycle makers are aware of this click, and so try to fill the ball circle as exactly as may be, so that there will be only a very small clearance possible between any two balls, and hence no considerable possible extent of drop from one ball position to another. Cycle ball-bearing balls weigh only a little, and a very slight surface friction would prevent any ball from making any drop whatever. Since this clicking noise caused by the dropping of the ball in a slack-filled bearing always occurs, it follows that at one point in every ball-bearing each ball is absolutely free from all restraint, and can and does fall by its own weight a certain distance. A moment's reflection makes it perfectly clear that if the balls are all free at one point of their travel they must of necessity be free at many other points, because the cones and cups are nearly round. The actual travel and work of the balls in a loaded ball-bearing having a slack-filled circle of

balls, is as follows: either one or two balls in the line of load support carry all the load, and are firmly held in their instantaneous locations by the load pressure, and could not slide away from that position without great friction. All of the other balls in the bearing are very nearly free. If the balls are nearly of one diameter, and the ball tracks are nearly true circles, then the balls closely adjacent to the one or two load carrying balls are held in position by a very slight friction, constantly and rapidly decreasing as the ball position is removed from the load carrying balls, and very quickly reaching a location where the balls are free to drop, and do drop and make the click.

This clicking of balls in a slack-filled bearing is a very small and seemingly unimportant matter, but it could not possibly occur if the action of the balls in load carrying were not, as here asserted, confined wholly to the one or two balls which are at the instant passing the line of load pressure.

The two-point ball-bearing, now almost exclusively used in bicycle construction, cannot be expected to give satisfactory results under very much more than ordinary bicycle loads, because of an increase of ball crushing pressure due to the form given to the two-point bearing to obtain a ready adjustment.

Fig. 4 is a diagram of that arrangement of jointed levers known as the toggle joint, which is much used where heavy pressures acting through short ranges are desired.

The load is shown in Fig. 4 as supported by two links, *C* and *D*, jointed to the two sleeves, *A*, *B*, which are free to slide on the supporting and guiding rod *R*. As the load descends *A* and *B* are forced apart at a constantly decreasing speed and with constantly increasing power, so that when the links, *C*, *D*, take a nearly horizontal position the sleeves, *A*, *B*, are forced apart by a strain vastly exceeding the weight of the load, all as is perfectly well understood. Precisely this condition of affairs exists in the two-point ball-bearing, except that in the two-point ball-bearing, owing to the disposition of parts, the members corresponding to the sleeves. *A*, *B*, tend to move toward each other.

Fig. 5 shows the parts shown in Fig. 4 in different positions; the links, *C*, *D*, stand upright, and the load cannot exert a separating influence on the sleeves, *A*, *B*, which each have simply to support half the weight of the load and linkage above them. In Fig. 4 the sleeves *A*, *B*, are moved away from each other by a very powerful impulse, far in excess of the simple weight of the load, while in Fig. 5 the same load and parts exercise no separating influence whatever on the sleeves *A*, *B*. As Fig. 4 correctly

shows the loads and stresses imposed by the two-point ball-bearing, so Fig. 5 correctly shows how the load is carried in a four-point bearing.

To make this clear, Figs. 6 and 7 are given, in which balls take the place of the links *C, D,* and the sleeves *A, B,* Figs. 4 and 5.

In Fig. 6 the disposition of the parts is the same as in Fig. 5, and it is obvious that each of the two balls in the positions shown must carry half the weight of the load above them, no more and no less, and that the load on each of the four bearing points of the two balls is exactly the same; that is, the half of the weight of the mass above them. When it is remembered that the durability of a ball-bearing depends wholly upon the crushing load in pounds resisted by the ball, the importance of such an arrangement of parts as will give the balls only that crushing load due to the actual weight of the mass carried above the balls becomes apparent.

In Fig. 7 different positions of the same parts shown in Fig. 6 give diagonal lines of load support through the ball centres, thus introducing exactly the conditions shown in the toggle linkage, Fig. 4, and very greatly increasing the crushing load on the balls over that normally due to the load in pounds carried above the balls.

Fig. 8 shows no adjusting mechanism, but is otherwise a correct exhibit of the regular practice of one of the largest American cycle factories. In this Fig. 8 the angle of support is 45 degrees, same as in Fig. 7, and the balls are subjected to a much greater crushing effect than the actual weight in pounds of the load carried. It is not needful to know exactly the excess of load imposed by the angular line of load support on the balls. It is enough for the designer to know that one plan of construction is very much more favorable to durability of parts than another, and he can then work understandingly.

As shown in Fig. 8 the ball load is not increased to its limit, by any means. Fig. 9 shows an extreme case, probably never met in practice, the angle of support being reduced to about 15 degrees. Inspection at once shows the mechanical reader the very great tendency of the parts in this Fig. 9 to push the hub flanges outward and to force the tops of the cones inward toward each other, with, of course, a corresponding increase of ball crushing pressure; the action here is exactly the same as in Fig. 4, in case the links *C* and *D* were brought down well toward a horizontal position, the direction of strain being reversed, of course, outward in Fig. 4, instead of inward and outward both in Fig. 9.

Fig. 10 shows a four-point bearing, 45 degrees cup and cone angles, the right-hand ball cup being free to slide. This form of bearing reduces the crushing load on the balls to much less than one-half that existing with the two-point bearing, loads the same.

This highly favorable result comes, first, from doubling the points of load support on each ball. This at once reduces the ball crushing load at each point of support by one-half. Again, the angle of support is zero, and hence the balls cannot have an increase of crushing load beyond that of the actual load in pounds applied to them. Where the load is supported by normal lines of resistance, as in Fig. 5 and Fig. 10, there is no possibility of the angular load support action shown in Figs. 4 and 7, and in an extreme case in Fig. 9, where the crushing effect on the balls and the strain tending to force each cup away from its coacting cone is many times greater in pounds than the actual weight of the load carried by the bearing.

In a bicycle the side thrust on the wheel is nothing on an unobstructed roadway, either on a straight or curved course, because the rider is forced to keep the plane of the cycle load at the normal load angle to preserve his equilibrium. When a bicycle wheel rubs sidewise against an obstacle a side thrust is, of course, created, but this is not a thing in the regular course of bicycle use, which does not call upon the balls to resist side strains to any noteworthy extent.

The case of the tricycle or quadricycle is wholly different, heavy side thrusts being of constant occurrence on curves, and from meeting obstacles. In this case the four-point bearing has twice as many points of resistance as the two-point bearing has, which is of the highest importance, because a ball and its cup and cone may obviously carry a certain side thrust successfully and without damage, and yet be "cut" and so ruined by a side strain twice as great. It seems not unlikely that this single point of side thrust resistance has been the principal cause of the failure of the two-point ball-bearing in road wagons in so many instances, and of the generally current belief among automobile constructors that ball-bearings are not suitable for use in any except the very lightest types of vehicles.

The four-point bearing will carry comparatively large loads without deformation or wear, and hence is permanent if so fitted in the first instance as to need no adjustment. If the ball cup is in one piece, and the ball cones are ground accurately to length so that they meet, and are supported rigidly against end motion, then the four-point bearing, as here shown and described, can carry

the loads imposed by automobile requirements for a long period without attention, and may fairly be termed a permanent bearing.

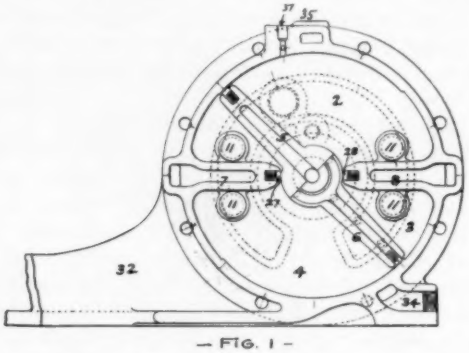
There can be no doubt that such a bearing, supplied with vaseline when filled with the balls and perfectly dust proof, is capable of carrying a certain load during a comparatively long period of continuous action, without additional lubrication or attention of any sort. A wagon fitted throughout with such bearings would be perfectly clean, so far as all revolving surfaces were concerned, and hence permanent bearings of some kind will undoubtedly appear in the final automobile, which certainly will not make the driver a slave to the oil can, nor demand that he be clad in greasy leather clothing.

The Lepper-Dial Gasoline Motor

THE engine shown by the accompanying drawings is a radical departure from regular practice, possessing the two features of lightness and freedom from vibration to an extent practically unknown in any of the designs now upon the market.

Capable of construction upon a weight of thirty to thirty-five pounds per horse-power, it offers great advantages over the well-known single engines for automobile work. Small space and flexibility of design, with reference to surrounding details, may be also numbered among its advantages.

The basis of the above claims is made apparent by a careful reference to the drawings, in which Figures 1, 2, 3 and 5 show



— FIG. 1 —

the engine as originally designed; Figures 8, 9 and 10 the same with a mitre and spiral gear drive for the cams; also the governor details in the design, which are regarded as superior to the original.

Referring to the figures, the casting, 32, is circular at the large end, forming the cylinder and carrying the frame, with bearings, 33, at opposite end.

The cylinder is partially divided by the fixed partitions 7 and 8, and the division is completed by the hub of the piston at 26—see Figure 2.

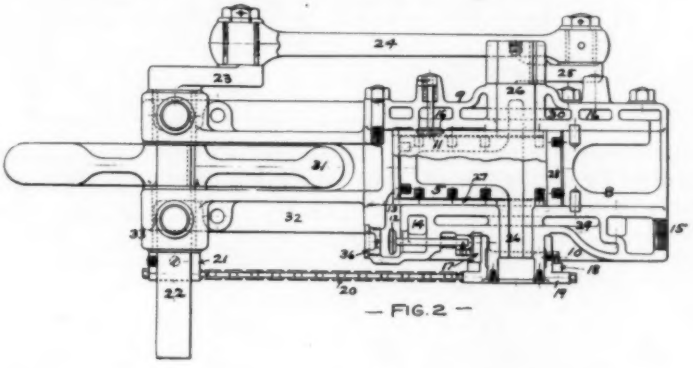
The Lepper-Dial Gasoline Motor

The cylinder is enclosed at the sides by removable heads, 9 and 10; one containing the inlet and the other the exhaust valves and passages.

The piston consists of hub, 26, and two blades, 5 and 6 (preferably hollow); these blades, together with the partitions, 7 and 8, dividing the cylinder into four exploding chambers; each acting on the well-known four-cycle principle.

The piston oscillates through a right angle (the centre of its motion being a vertical line through the trunnions), and, through hub 26 actuates the swinging arm 25; thus reciprocating the connecting rod 24 and rotating the crank shaft 22.

The air and vapor mixture enters at the opening 16, and, gaining access to all of the check valves, 11, enters each in its turn; is compressed, ignited by electric device, to be described;



— FIG. 2 —

drives the piston forward, and is exhausted during the return stroke of piston through each passage, 13, and exhaust valve, 12, in its turn; through passage 14 and to the atmosphere or muffler at 15.

Thus there are four inlet valves actuated by suction, and four exhaust valves operated by mechanism to be described; and the explosions take place in proper order, from right to left or the reverse, according to the shaping of the cams for exhaust and ignition.

In the figures mentioned above the mechanism used for driving the cams consists of "two-to-one" sprocket wheels, 19 and 21, and chain 20; but the preferred method consists of mitre-wheels, shaft and "two-to-one" spiral gears, 52 and 53; in either case the cams making one-fourth of a revolution while the engine is making one stroke.

The sprocket 19 is loosely mounted upon the hub of cylinder head, and is free to revolve in the proper direction. It carries the exhaust cam 17 rigidly fastened to its hub, and the igniter

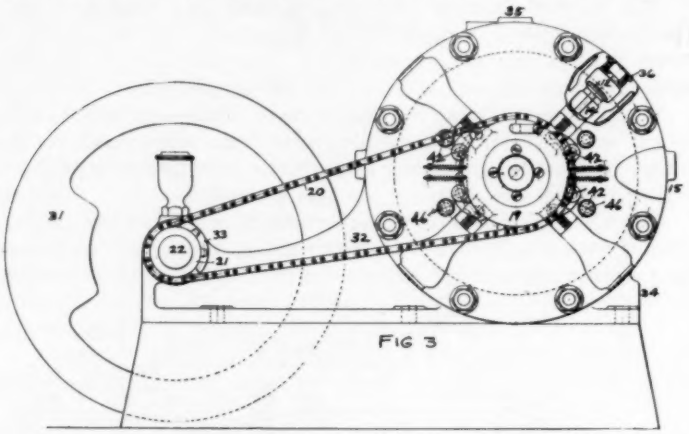
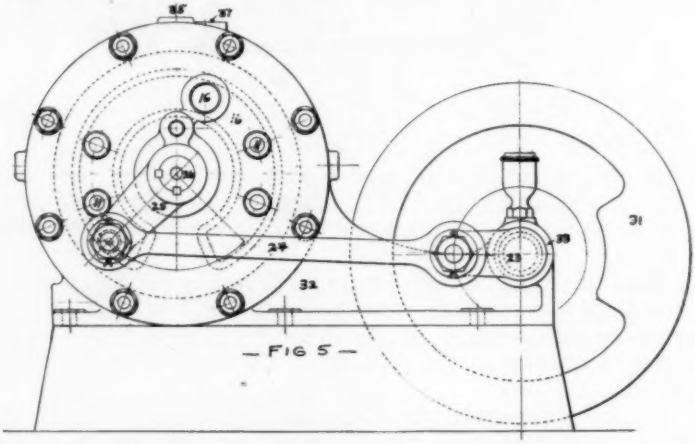


FIG 3

cam 18 loosely mounted and free to revolve backward, but driven forward by spring pin 38; thus preventing damage if the engine starts in wrong direction.



— FIG 5 —

There are, necessarily, four complete mechanisms of this character, and these are operated, in their proper sequence, by the cam. The piston is packed by spring strips 27, as shown, and is hollow to allow for circulation of air or water for cooling.

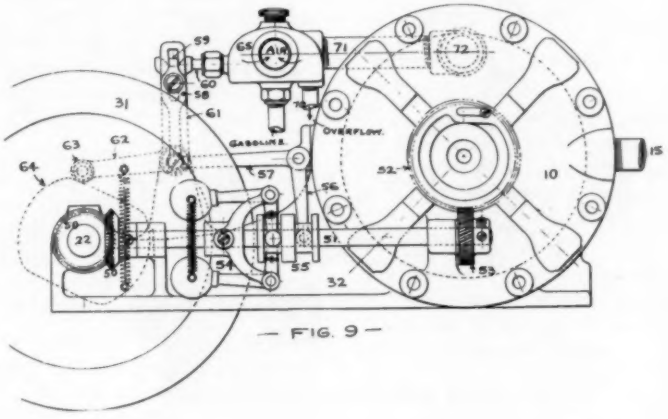
The Lepper-Dial Gasoline Motor

The cylinder heads and valves are similarly cooled; the circulating water entering at 34 and leaving the casing at 35.

It will be seen that the partitions 7 and 8 are also hollow and cooled with water.

The exhaust valves are made accessible by plugs, 36, and the inlet valves may be similarly arranged.

The cycle of operations is as follows: Supposing the piston to be in the position shown in Figure 1; then the charge in compartment 1 is just igniting; that in 4 has been drawn in; that in 3 has been completely exhausted, and in 2 has been fired and expanded to its limit. As charge 1 expands charge 4 will be compressed; 3 will be drawn in and 2 will be exhausting.



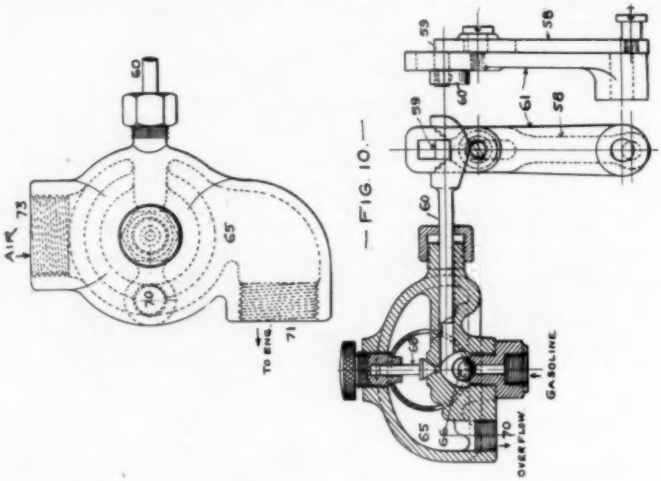
— FIG. 9 —

The preferred method of mitre and spiral gearing makes it possible to apply the governor mechanism as shown in Figures 8, 9 and 10.

Its operation is as follows: The gasoline pumps plunger 60 (Figure 10) is operated by the slotted lever 61 through the end, 59, of link 58, engaging in the stepped end of the plunger. When the link is down, as shown, the pump operates through its entire stroke, produced by the cam 64 (Figures 8 and 9), roll 63 and arms 62 and 61; but, if the speed is increased, the governor, 54, draws the collar, 55, to the left, operating, through levers, 56 and 57, to raise the end, 59; and allow a portion of the throw of the lever, 61, to be used before striking the steps shown. If the link is lifted to the highest notch, the whole stroke will be lost, and the pump fail to act.

The vaporizer consists of a casting, 65, with corrugated surface shown; pump, 60, and valves 66 and 68; the outward stroke of the pump lifting the charge of gasoline through the ball valve 66, and the in-stroke forcing it up through the adjustable spray valve 68, and allowing it to spread upon the corrugations. The air drawn through the opening 73, passing over the surface, becoming charged with vapor, and passing through pipe 71 meets the auxiliary air supply at 72, and is drawn into the engine.

By this description it is seen that, while securing the known advantages of the four-cycle engine within the cylinder, the inventors have at the same time quadrupled the rapidity of its



— FIG. 10. —

action, and doubled that peculiar to the two-cycle form, obtaining the same cycle at the crank pin as in the double-acting steam-engine, viz.: An impulse at each stroke of the piston. Thus, with a crank shaft running at five hundred revolutions, the single four-cycle engine receives two hundred and fifty impulses per minute, while the engine described receives one thousand.

This motor is the subject of letters-patent recently issued to J. G. Lepper and W. F. Dial, of Bridgeport, Conn., and a one and a half horse-power model has been operating at Bridgeport for a few months past, giving excellent results for such an entirely new departure.

The Automobile Index

Everything of permanent value published in the technical press of the world devoted to any branch of automobile industry will be found indexed in this department. Whenever it is possible a descriptive summary indicating the character and purpose of the leading articles of current automobile literature will be given, with the titles and dates of the publications.

Automobiles—

New electric carriage, called a New York Trap, made by the National Automobile and Electric Company, Indianapolis, Ind., 2½ horse-power motor. "Motor Vehicle Review" (American), September 13, 1900.

Electric vehicle, five styles; runabout weighs 550 pounds. Baker Motor Vehicle Company, Cleveland, O. "Motor Vehicle Review" (American), September 13, 1900.

Automobiles, Gasoline—

An illustrated article by William Baxter, Jr., in which he goes into the principles of gasoline engine operation. "Appleton's Popular Science Monthly," New York, October, 1900.

Carburetter—

An illustrated article describing the Remington motor and carburetter. "The Motor Vehicle Review," Chicago, October 4, 1900.

Carburetter, Self-Governing—

A French invention by M. Charly, and tested by Messrs. Burford & Van Toll, of the New Orleans Motor Works, Twickenham. It is said to have governed so well that the mixture lever is done away with and only the throttle and sparking levers are retained. "The Autocar," London, September 15, 1900.

Compressed Air Motors—

By H. D. Cooke. Outlines the history of the use of compressed air for power and motive power purposes. "Street Railway Journal," New York, September 29, 1900.

Cycle Motors—

A number of interesting machines are shown and described in the "Cycle and Automobile Trade Journal" for September 1, 1900.

Loosening of Screw Nuts—

Dwelling on the necessity for keeping the nuts of automobile and bicycle parts tightly screwed up. "Cycle and Automobile Industrials," Paris, September 16, 1900.

Motor, Petroleum-spirit—

An illustrated description of a novel form of motor invented by M. Paul Nicolas. The engine comprises four cylinders, placed at angles of 90 degrees around the crank chamber, the single crank shaft passing through centre of chamber. "The Motor-car Journal" (English), September 22, 1900.

The Automobile Magazine

Motor-car, Capel's—

An illustrated description of a motor vehicle of new design. Article contains ten illustrations. "The Automotor Journal," London, August, 1900.

Motor, The Kaing—

Description, with illustrations, of motor used on the voiturette bearing the same name. "Motor-car Journal," London, September 29, 1900.

Sparking Plug—

The Dulait-Baras sparking plug, which takes care of the expansion and contraction of the porcelain, is shown in "The Motor-Car Journal," London, of September 8, 1900.

Speed Changing Device—

A novel device which is being put on the market by the Niles Tool Works, Hamilton, O. "Motor Age," Chicago, September 6, 1900.

The Manufacture of Automobiles in Great Britain—

Account of the agitation in favor of extending the French market for automobiles into the British Isles. "La Locomotion Automobile," Paris, September 20, 1900.

Thousand-miles Automobile Trials—

By W. Worby Beaumont. Illustrated description of numerous motor vehicles. "The Engineering Magazine," New York, October, 1900.

Tricycles-Motor—

Air-cooled motor-tricycles, by Simpson & Strickland, of Plymouth, England. A sensible looking machine for practical use. "The Autocar," England, September 8, 1900.

Tricycle, Rochet Motor—

An illustrated article descriptive of a tricycle which has proved quite successful in the international competition at the Paris Exposition. "The Automotor Journal," London, August, 1900.

Tubes, Lampless Ignition—

This article, which is illustrated, describes a new form of tubes, invented by Anton C. von Fahnenfeld and E. Stadler von Wolfersgrün, in which spongy platinum is used which remains incandescent in an atmosphere of hydrogen gas and air. "The Automotor Journal," London, September, 1900.

Voiturette, The Henroid—

An illustrated article describing a new style of machine. In general appearance it resembles the De Dion vehicle, but the general arrangement of motor and transmission gear is entirely different. "The Motor-car Journal," London, September 29, 1900.

Wiring of Electric Vehicles—

Plans of wiring used in the Waverly automobiles is shown and described in the "Motor Age" of September 6, 1900.